europress PUBLICATIONS

THE MICRO USER

Volume 9 Number 6 August 1991 £1.50

SOUNDS AMAZING

Digital playback on your Beeb

ICONS BY DESIGN

Brighten up your programs

COLOUR MONITOR

Check the quality of your screen

EASY LOADER

Simplify desktop file handling

REVIEWS

- Squirrel
- Easi-Writer
- Voice Builder
- Business Supplement

PLUS all the latest games

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Can Acorn's big machines really compete?

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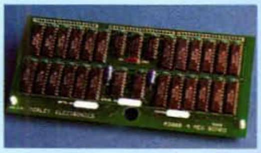
Unlike most other cards, our upgradeable card can be upgraded from 1MB to 3MB at a later date for maximum flexibility.



- Fully compatible with all Acorn software.
- A must for all serious Archimedes owners.
- Make full use of powerful RISC-OS packages.

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- Easy to install - simply plug in and run.
- High quality japanese drive.
- Includes full fitting kit and instructions

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Kit includes:

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- Case
- Power supply
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64k Printer Buffer	£115	27128 Blank Eproms	£3
256k Printer Buffer	£199		

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Existing users of our BBC Teletext Adapter can have the unit converted to an Archimedes version. £35

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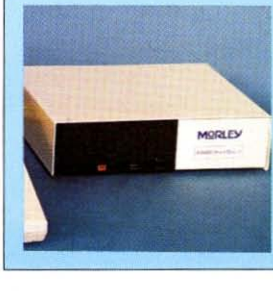
Faster and cheaper than 8 bit SCSI.



INTERFACE

ST506 Podule Kit	£169

A3000 DISK DRIVES

Including ST506 Podule, cased drive with power supply, cable & leads

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INTERFACES

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Clares ProArtisan	£82
Clares Artisan 2	£49

M/B 8 BIT SOFTWARE

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THE ULTIMATE ADD-ON FOR ALL SERIOUS MASTER USERS

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Allows an additional 8x16k and 4x32k ROMS to be installed in the Master and still leaves the cartridge slots free.

Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice-versa. £40

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20meg	£399
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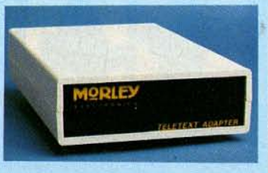
Larger Drives	POA

TELETEXT



THE MORLEY TELETEXT ADAPTER

BBC/Master	£104
Compact	£120
RML Nimbus	£104
Archimedes	£125
Optional PSU	£9.50

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The fastest, best value programmer in the market.

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Includes full ROM management software with numerous features £30

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9am to 5:30pm (Mon-Fri)

Acorn

We are an Acorn dealer and service centre. If you would like to have a look at the A3000 or any other Acorn/Morley product please feel free to call in and discuss your requirements with our staff.

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How To Order....

BY POST: Enclose cheque made payable to MORLEY ELECTRONICS LTD.

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CARRIAGE: £1 on most orders. £3 on larger items. Hard Disks, Computers + Monitors £10 (carrier).

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News Trade Distribution: UMD 071 700 4600

COVER STORY

Better business

In the commercial world the Acorn's 32 bit machines have yet to score. We examine some new software that will help to make the dream into reality.

SPECIALS

44 **Game Diary**
The everyday story of programming folk: The trials and tribulations of a part-time games writer.

51 **Colour Monitor** ★
Find out if your visual display unit is really up to scratch with this set of test routines.

55 **Teletext Carousel** ★
Collect many pages of a set and re-display them at will with this handy little program.

57 **Application**
Find out how easy it is to have icons for your own programs and applications.

59 **Teletext Editor** ★
Now you can produce Mode 7 screens quickly and easily with our simple utility.

89 **Easy Loader** ★
Double your load options and make the Archimedes DeskTop even more user-friendly.

94 **Talking pens** ★
Using flatbed plotters can be difficult and confusing, but now learn how easy it can be.

Type-it-in

This symbol indicates that the feature contains at least one full length listing for you to key in on your micro. ★

All the major listings in this magazine are accompanied by checksums to help you key them in correctly. *Get it right* ✓

For full details of how to use them see the article on page 56 of the February 1991 issue.

MICRO USER CLASSIFIEDS

The best bargains in the world of all Acorn micros come from readers of The Micro User. Turn to Pages 88 and 106 to find just what you're looking for – from cheap modems to complete computer systems.

EDUCATION

23 **Update**
Up-to-the-minute news of the Acorn range of micros in use in the world of education.

28 **Reviews**
Catch up on the latest software for the BBC Micro series in schools, including:

- DeskTop Folio
- Time Traveller
- FX

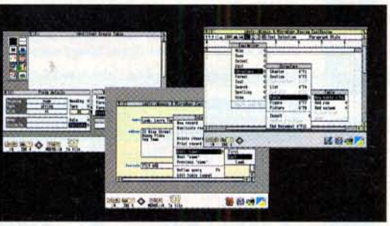
Freddy Teddy's Adventure
TOPOLOGIKA
Selective Software
An educational
ADVENTURE
Teacher's Manual
You can hear a loud buzzing noise.
Click mouse
Time Traveller
YEARS
DECADES
CENTURIES
TEACHER'S HANDBOOK
Homerton College, Cambridge

REGULARS: News 9 ● Mad Hatter 18 ● Body

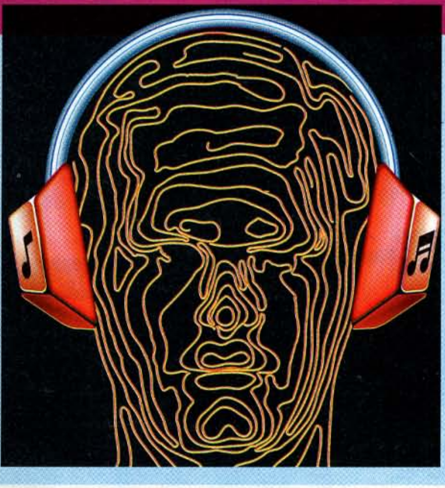
33 **Squirrel**
A real database is essential at home and at work. We check out this new one to see if it can stand the pace.

65 **EasiWriter**
Can a new word processor make it in a market already dominated by powerful software? We take a look.

82 **Business Supplement**
Colour separation for DTP work, multi-machine connectivity and high quality mailmerging all for next to nothing?
But can all this really be true?



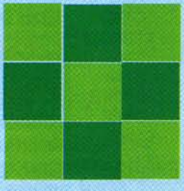
Newcomers



109 **Voice Builder**
Try out this easy-to-use package to design and build your own Archimedes/A3000

98 **Playback** *
Sound sampling on a BBC Micro? Crazy but true, you can hear sound samples on your 8-bit micro.

113 **Magic Square** *
Numbers can be fun, but have you ever tried to work out the correct values for a magic square?



MOTORS 3
POINTS 250
DAMAGE 35
TURBO BOMBS CREDITS LVL
Compass
DODGE CITY
ZONE SELECTED : SWEET MEADOW

Software SCENE 39

Our experts delve into what's among the latest games releases

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Find out how to subscribe on Page *104*

NEXT MONTH IN THE MICRO USER

Find out about Impulse, an amazing breakthrough for inter-program communications on the Archimedes and BBC A3000. Dig your vegetables with some serious software from Mike Goldberg. Plus our PD section full of great money-saving ideas.

Building 35 ● Problem Solved 47 ● PD Page 101 ● Letters 107

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We can match or improve on prices advertised or quoted in or from this magazine please phone for the best deals.

We operate the Acorn Schools, Academics & Finance schemes.

* Pack includes PC Emulator, 1st Word Plus, Genesis. ** + Acorn DTP.

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100 Mb External Hard Disc	£845
200 Mb External Hard Disc	£1245
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ArVis S-VHS Encoder Board	£145
ArVis Video Graphics Board	£877
Atomwide 8 Mb Memory Upgrade	£850
Chroma 345 Overlay Board	£389
Dongle Dangle (Impression/Oak)	£6
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Colour System	**£1289**
Eizo 9060 SZ System	**£1499**

Dabhand 410/1 to 440/1

Acorn A410/1 upgraded to A440/1 specification using a Branded 40 Mb 28ms drive formatted and tested as above.

A440/1 specification	**£1299**
Colour System	**£1488**
Eizo 9060 SZ System	**£1699**

Dabhand ST506 Hard Disc Drives

Archimedes A410 Internal Hard Disc Drives for use with 'on-board' ST506 winchester controller. Comes complete with mounting chassis, screws, connecting cables and easy to follow fitting instructions.

20 Mb 28ms	**£129**
40 Mb 28ms	**£245**

A3000 SCSI Devices

Please refer to Oak External SCSI prices in the opposite column as prices for A3000 external units are the same.

A3000 Ram Upgrade

Atomwide Ram Upgrades

1 Mb Ram Upgrade	**£79**
4Mb upgrade to above board	£130
4 Mb Ram Upgrade	**£175**

A3000 Upgrades

5.25" External floppy disc cable	£15
5.25" External f/disc buffer (Pres)	£46
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Dust cover (Keyboard + Monitor)	£12
User & Analogue Podule	£46
Monitor Stand (Acorn)	£29
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Serial Upgrade	£19
Serial Link Kit (BBC-Arc)	£14
User & Midi Podule	£46
VIDC Enhancer	£29

A400 Series Ram Upgrades

Fast Samsung Ram complete with step by step fitting instructions.

1 Mb Ram	**£50**
2 Mb Ram	**£95**
3 Mb Ram	**£140**

Standard Monitors

Acorn Colour	**£199**
Microvitec Cub 3000	**£199**
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Philips Mono (Green)	**£85**

All monitors come with free lead. State type of computer when ordering.

Multiscan Monitors

EIZO 9060SZ Flexiscan	**£399**
EIZO 9070SZ Flexiscan ^	**£599**
Taxan 770+ LR Multivision	**£425**
Taxan 795 Multivision ^ **	**£495**
Taxan Viking II Mode 23	**£799**

^ comes with free VIDC enhancer.

** monitor has 0.26 dot pitch and Sony Trinitron tube.

Master 128

Master 128	**£369**

Floppy Disc Drives

5.25" Single 40/80 no psu	£95
5.25" Single 40/80 with psu	£109
5.25" Dual 40/80 no psu	£185
5.25" Dual 40/80 with psu	£199
3.5" Single with psu	£85
3.5" + 5.25" 40/80 no psu	£185
3.5" + 5.25" 40/80 with psu	£209

Printers

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Citizen Swift 9	£179
Star LC10	£139
STAR LC200 COLOUR (9 pin)	£199
CANON Bubblejet BJ-10e	£289
Canon Bubblejet BJ-130e	£449
Sheetfeeder for BJ-10e	£59
Citizen Swift 24	£249
Colour Kit for above (also Swift 9)	£39
STAR LC24 - 200	£239
STAR LC24 - 200 COLOUR	£289
Sheetfeeder for LC24 - 200	£69
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HP Paintjet	£795
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LASER DIRECT (LPB8 Hi Res.)	£1349

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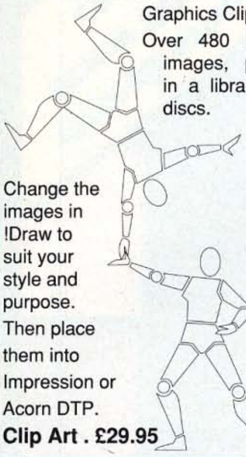

Change the images in !Draw to suit your style and purpose.

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C: A Dabhand Guide	£14.95
Archimedes Assembly Language	£14.95
Archimedes Operating System	£14.95
The above books have accompanying discs add £5 for 5.25", £7 for 3.5"	
A3000 Technical Guide	£29.95
A540 Technical Guide	£65.00
Acorn DTP Advanced U.G.	£14.95
Archimedes First Steps	£9.95

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First Word Plus, DTP, Assembler	(ea.) £10
ANSI C Version 3	£19

Printer Drivers

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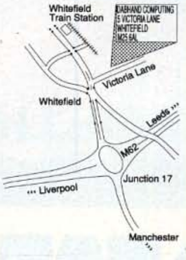

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NEWS BEAT

Vangelis rocks along with Archi

WHEN rock composer Vangelis gave one of his rare concerts recently in Rotterdam the crowd of 150,000 and a huge national television audience were treated to a spectacular laser show controlled by nine Archimedes A440 computers.

Sited on top of 18 storey tower blocks on the city's North Island, the Acorn machines controlled scanner amplifiers to drive motorised mirrors which directed the lasers on to enormous screens and other tower blocks screened with white blinds.

Music by Vangelis came from a barge anchored in the river and the computers were linked by telephone data lines to synchronise the lasers. Each computer drove two pairs of scanners for lasers placed 400 metres apart.

Laser projection software used by the computers to generate the special effects was written by Micro-Robotics of Cambridge. They are best known for the control equipment fitted into the shells of the Teenage Mutant Ninja Turtles in the film of the same name and for the processor at the heart of the Oval cricket ground scoreboard.

Dutch company Resal Laser produced the laser animations using Cherry digitisers to create an array of special effects. These were programmed with time cues to synchronise with the music.

INTERLACE
BARS
OFF
ON
PAL OUT
RGB OUT
UHF
RGB IN
POWER
WILD VISION
CHROMA 150

Coders can be teacher's pet

THE Chroma 100 series of PAL coders from Wild Vision (091-519 1455) has been developed for people who use computers for teaching, creating and giving presentations and for animation.

Converting RGB output from computers or any other RGB source to high qualtiy PAL-coded composite video, the Chroma devices have many applications.

Computer generated animation sequences can be saved and displayed on television or edited into live video sequences filmed with a camcorder, opening up a range of possibilities for both amateur and professional film makers.

Computerised data such as pie charts and data tables or output from laboratory and studio equipement can also be incorporated into documentaries and promotional or teaching videos.The PAL coders allow computer output to be displayed on multiple monitors or televisions, a facility which is particularly useful for teaching.

Two coders make up the Chroma 100 range. The Chroma 135 has one PAL composite and one UHF output while the Chroma 150 has two PAL composite, two RGB outputs and one UHF output.

The Chroma 135 costs £129 and the 150 costs £185. Prices are exclusive of VAT and carriage.

Desktop Folio lands in class at last

AFTER two years under development, Desktop Folio for Archimedes is now available from educational software publishers ESM (0223 65445) and already it has scored a notable success.

Durham Microtechnology Centre have placed a major order with ESM to put the word-processing and desktop publishing package into all schools in the county.

"We chose Desktop Folio for all primary schools in the authority because it unleashes the potential of the A3000 and allows pupils to use one DTP package from reception to top juniors and beyond", said Dave Maddocks, Durham's specialist inspector for IT.

"The level of complexity of use is controlled by the teacher and pupils progress from a simple screen format to more complex formats as their skills develop".

According to ESM, their warehouse has been processing hundreds of orders for Desktop Folio following its publication.

"After so many months of hard work, we are delighted with the final product which incorporates extra features requested by teachers in trialling", said ESM's divisional director Ysanne Heald.

"I have no doubts that schools will find it a well designed and complete publishing resource for use in all curriculum areas".

Emulator is luring the Dos diehards

WITH the latest upgrade to its PC Emulator Acorn is offering committed Dos users an attractive carrot to switch them on to Risc OS.

Version 1.60 of the Emulator now runs from and returns to the Risc OS environment, leaving current DeskTop applications and data intact.

And on machines with 2Mb or more of memory, Dos applications can be multitask with native programs in a DeskTop window.

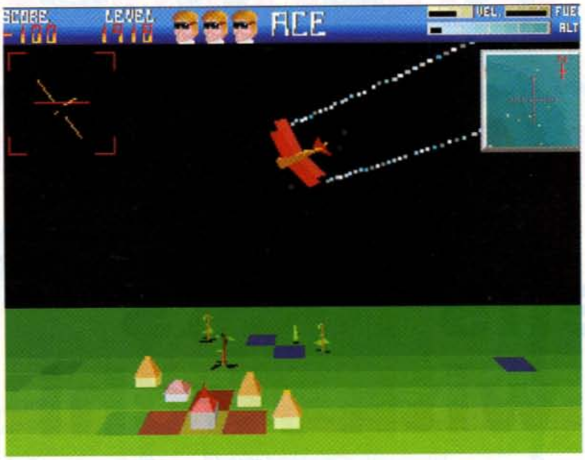
Dos files can be accessed directly, allowing them to be copied, deleted and dragged as if they were Risc OS files. Users can also access standard PC CD Roms through CDFS and MSCD extensions.

MS Dos 3.3 is supplied with the Emulator and a special mouse driver allows standard mouse to perform as a Microsoft Bus mouse.

The speed of floating point operations has been increased by a factor of 14 over that of Acorn's previous PC Emulator through emulation of the Intel 8087 maths co-processor.

"Version 1.6 of the PC Emulator is easier and more versatile to use", said Acorn's marketing director Mike O'Riordan. "That said, however, I am convinced that previously diehard Dos users who use the Emulator will, in a very short time, discover the benefits of using Risc OS and will want to use it permanently".

PC Emulator version 1.6 costs £99 plus VAT, with a £29 upgrade for users of the old version.



Strategy's the name of the game in Air Supremacy

A mic for Arc

OAK Solutions (0532 502615) claims to have overcome two of the main drawbacks to sound sampling on Archimedes computers with its latest product, Arc Recorder.

It is designed to give 8 bit quality sampling without the need for large expenditure and without taking up a valuable podule slot.

The hand-held, omni-directional electret condenser microphone plugs into the printer port of any Archimedes or BBC A3000 machine. With integral wind shield and on/off switch it is connected via three metres of shielded cable.

Accompanying software allows samples to be recorded, played back and transferred to Genesis II or other Archimedes applications through the standard Armadeus file format.A Genesis II support module and application is available.

Ideal for teaching uses, Arc Recorder costs £29.95.

4Mation moves south

EXPANDING educational software house 4Mation (0271 25353) has moved its UK base to new premises and has also announced an offshoot in New Zealand.

"On the other side of the world, 4Mation New Zealand has been established to cater for the ever-increasing number of Kiwi Archimedes users", said 4Mation's Mike Matson. "Many of our programmers work from New Zealand and this sister company will be in the capable hands of Fred Frampton, one of Acorn New Zealand's leading dealers".

To accommodate its growing UK staff 4Mation has moved to purpose designed premises at 14 Castle Park Road, Barnstaple, Devon, EX32 8PA

More courses

MINERVA Training, an offshoot of Minerva Software, has expanded its activities to include training on the Archimedes and related software. Courses now include Impression, Pipedream, MultiStore, TimeTabler and Atelier.

In addition to scheduled courses, Minerva offers a tailored service for groups or individuals to suit specific needs.The one day courses at the company's Exeter Training Centre cost £110 plus VAT, and accommodation can be arranged. For more details ring 0392 426160.

Genius takes to the air

DUE for release in late summer is Air Supremacy, the latest offering from Superior Software (0652 58585), which combines air, ground and sea warfare into a fascinating blend of battle strategy.

Level one starts in the Europe of 1918 with its biplanes and primitive tanks. The second level moves to 1944 where Pacific warfare includes powerful fighter aircraft and gunboats. On level three, it's 1991 action featuring desert tanks and jet fighters.

Once these three training levels have been completed, the action becomes futuristic, leaping forward to the year 2150 with a rapid attack hovercraft and super-powered jets.

Air supremacy is the aim of the game and to gain it players must balance their tactics between air, ground and sea attacks. The vital element is to protect your radar, and in many cases that can only be done by landing your plane and taking to the tanks.

"It is a case of being in the right place at the right time and is a mixture between our flying combat game Zarch and the tank program Conquerer", said Superior's Steve Hanson.

"It comes from a new programmer, Andrew Martin, who I think is a natural genius. He sent the game in to us on spec and it has needed very little doing to it".

Air Supremacy will be for Archimedes machines and should cost in the region of £20.

New laser on desktop

AEG Olympia (0753 630111) has launched a new compact desktop laser printer which combines HP IIP compatibility with a number of useful features at a price of £1,049.

The LP 60 offers 300 x 300 resolution from a Minolta engine with a maximum print speed of 6ppm. A 16 character LCD display makes setting up easy and 68 resident fonts are available in both portrait and landscape. HP compatible font cartridges can also be added via a built-in slot.

Standard 512k memory can be upgraded to 4.5Mb and additional features include an optional 500 sheet paper tray.

Newsboy is a robot

A ROBOT is roaming the streets of Abernyte village in Perthshire, but far from causing panic, it's doing the residents a favour. The mechanised marauder is a Roamer robot from Valiant Technology, and its Scottish wanderings are evidence of the imagination of local children.

Abernyte Primary was the a winning school in this year's Micros and Primary Education Awards for the enterprising use of technology. Pupils produce a self-financing annual newspaper using a wordprocessor and a database for adverts.

To perfect delivery routes, they have constructed a floorplan of the village and use the Valiant Roamer linked to a trailer. It travels round the miniature streets, helping the youngsters work out the most efficient delivery points.

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– extra rom		£7
– extra manual		^{V0}£7

ARCHIMEDES SOFTWARE

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ABBREVIATIONS

		Col	Colton	Mid	Midnight Graphics
		ComT	Computer Tutorial	Mit	Mitre
Ace	Ace	Dat	Data Store	Min	Minerva
Aco	Acorn	Dig	Digital Services	Oak	Oak
Apr	Apricote	Eiz	Eizo	Pil	David Pilling
Arm	Armadillo	Emr	EMR	Ser	Serial Port
Arn	Arnor	Gra	Graphics Factory	Sil	Silicon Vision
Arx	Arxe	Hum	Human-Computer	Sim	Simtron
Aut	Autodesk	Ico	Icon Technology	Spa	Spacetech
Bai	Baildon Electronics	ICS	Ian Copestake	Sta	Star
Bee	Beebug	Ife	IFEL	Sup	Superior Software
Cal	Calligraph	Iot	Iota	Tec	TechSoft
Can	Canon	Irl	Irlam Instruments	Wil	Wild Vision
CC	ComputerConcepts	Kad	Kador	4ma	4Mation
Cha	Chalksoft	Lin	Lingenuity	4th	Fourth Dimension
Cir	Circle	Lon	Longman Logotron	*D*	Draw format
Cit	Citizen	MicP	Micro Power	*P*	Paint format
Cla	Clares	MicS	Micro Studio	✓	***On special offer!***

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– Schematics	Sil	£475
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† Fitting is straightforward
‡ Fitting requires expertise

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- **Wimp Debugger** allows you to debug Wimp-based programs while testing and running them.
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- **Template File Browser** allows you to view the contents of a template file.
- **Application Shell Generator** utility for creating application directories, Obey files and their sprites.
- **Menu Editor** - create and edit Wimp menu structures for use in your own programs.
- **WimpAid** allows pointer, window and icon parameters to be dynamically displayed on screen.
- **Iconbar Shell Generator** allows you to build simple multi-tasking programs very easily, by creating a shell.
- **Desktop File Loader** allows you to load a program from the Desktop, rather than run it.
- **Icon Flag Generator** calculates the value of icon flags without recourse to binary arithmetic.
- **EasyWimp** provides a ready-made Wimp application shell to be used for creation of single-window applications.
- **Wimp Message Monitor** provides a means of monitoring the Wimp polling system.

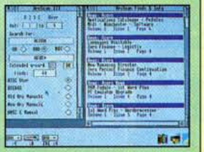
A multi-tasking customisable magazine database

ArcScan III

£18.95 inc VAT

Contains the following Databases:

- RISC User Volumes 1, 2 and 3
- BEEBUG Volumes 1 - 9
- Index to RISC OS Programmer's Reference Manual
- Index to ANSI C Manual (Release 3)
- Index to BBC Basic Guide
- Index to RISC OS User Guide



ArcScan III features:

- flexible keyboard search on any entry
- dynamic memory management, returning unused memory to the Wimp
- dedicated ARM code routines enabling rapid information retrieval
- improved search logic - choice of 3 logical operators: OR, AND and NOT
- fast scrolling Wimp window displaying finds
- detailed manual and extensive on-screen help
- new extended wildcard option
- fully user customisable

ArcScan Library Disc

£9.95 inc VAT

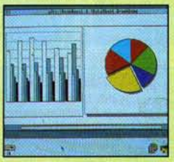
Offers an index for Acorn User and Micro User magazines from January 1987 to date. The Library Disc will be regularly updated to include the latest issues, and upgrades will be available for £4.45 . As a **Special Offer** you can purchase an ArcScan Library disc with vouchers for two upgrades for the price of £16.95 (inc VAT).

A selection of 12 multi-tasking

Desktop Applications

£14.90 inc VAT

- **DataSheet** - data presentation package for creating annotated graphs
- **Calc_570** - an implementation of a scientific calculator.
- **CharDes** - character designer for creating new system fonts.
- **Diary** - a Desktop diary and calendar.
- **B_to_T** allows Basic programs to be edited without leaving the Desktop.
- **FileFind** performs a hierarchical search for a given file, application or directory.
- **SetType** - change the filetype of any file by dragging it to the icon bar.
- **HotKeys** - allows single key presses to perform a wide range of functions.



- **Mouse** - change the mouse speed merely by clicking on an icon.
- **Print** allows files to be printed just by dragging them to the icon bar.
- **NotePad** provides for up to eight pages of jottings.
- **Dustbin** - sits on the icon bar and allows files to be deleted by simply dragging them to its icon.

Outstanding Value

7 Original Archimedes Games in

ArcOmnibus

£14.90 inc VAT

- **Amaze** - a graphically superb sliding block game with a difference.
- **Cribbage** - an excellent implementation of the well known card game.
- **Moric** - a colourful 'ladders and levels' game.
- **Ogre's Lair** - a highly entertaining arcade type game, providing hours of fun.
- **Pick a Pair** - a colourful game testing your skills of observation and memory.
- **BalloonMan** - burst the balloon - a Pacman style of game.
- **Dominoes** - a Desktop version of the classic game of dominoes.

File Handling for All

by David Spencer and Mike Williams

£9.95

File Handling for All is a comprehensive book which covers all the requirements of data storage and processing by computer, using the popular BBC Basic programming language for the examples. It is aimed at anybody interested in File Handling and Databases, whether beginners or more advanced users, and will appeal to all who want to learn more of this important subject.

The book starts with an introduction to the rudiments of file handling, and in the following chapters develops an in-depth look at the different types of files e.g. serial files, indexed files, direct access files, and searching and sorting. A separate chapter is devoted to hierarchical and relational database design, and the book concludes with practical advice on developing file handling programs.

The associated disc (£4.75) contains complete working programs based on the routines described in the book and a copy of Filer, a full-feature Database program.

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MARC THREE DISC

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- **Watchdog Anti-Virus** - protect your hard and floppy discs from viruses
- **Keystrip Generator** (both 9- and 24- pin matrix printer versions)
- **Encode** - a file encryption utility
- **CMOS RAM Manager**
- **Ovation Clip-art** - from Beebug's highly successful DTP package Ovation
- **Amaze** - a graphically superb and entertaining game
- Some of the best **Maestro** music files
- **Advanced Desktop Presentation Creator** - screen display with a choice of different fades
- **Palette Files for Colour Printers**
- A complete set of **ArcScan** index data for RISC User Magazine Volume 3

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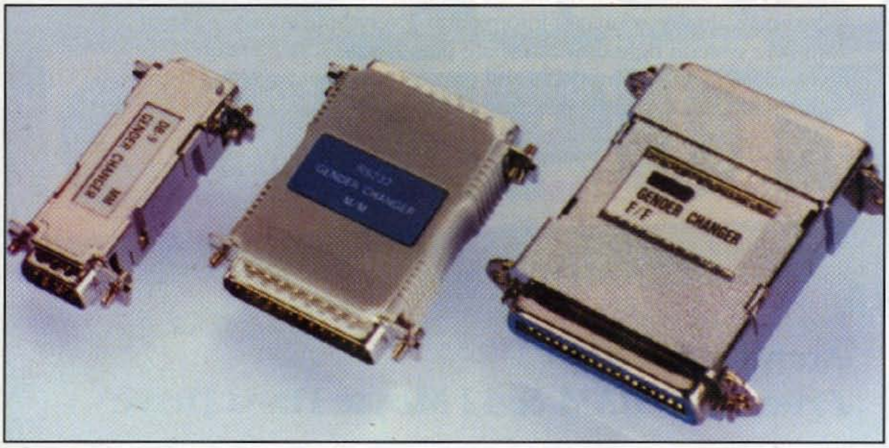
Sex change? No problem!



IF you want to change from male to female or vice versa, Interconnections (0483 797418) have the answer. They are now stocking a wide range of gender and wiring changers to help computer users avoid irritating compatibility problems. Both devices fit into computer ports and cable connectors. Gender changers convert male plugs to female sockets and back again. They are available for 9, 15 and 25 way D connectors and 36 way Centronic connectors. Wiring changers alter the wiring interconnections. Prices on application.

Unix for the Arc 400

USERS of the Archimedes 400 can now run Unix for the first time following Acorn's release of its X/Open XPG3-branded RISC iX version 1.2 for those machines.

Also Acorn R140 owners presently running RISC iX 1.13 can upgrade to an X/Open branded operating system. Acorn now claim to provide the lowest cost platforms for Unix in the marketplace.

Risc iX 1.2 is a BSD 4.3 and System V compatible Unix certified to X/Open XPG3 Base profile. As part of the installation, customers also obtain the latest versions of C, Fortran and Pascal compilers; the X Windows System, vll release 4; X desktop from IXI; OSF's Motif; connectivity software and a wide range of utilities and programmers' tools.

Upgrades start from £349 for R140 owners already registered with Granada Microcare and new installations start at £999.

Now networks can be that bit faster

TWO new products aim to save the time taken to load files and applications on to networks of BBC A3000 and Archimedes machines.

Broadcast Loader, from Acorn Computers, is a software module which allows files to be broadcast to a number of users in the time normally taken to load a pair of machines.

With obvious benefits to the education market, Broadcast Loader is for machines using Risc OS and networked over Econet. Although not designed for use with BBC Micros or Master computers, it can be operated on networks which include those machines without interfering with the transmission between Risc OS workstations.

Complementary to Acorn's Econet and Level 4 fileserver, Broadcast Loader is independent of the type of fileserver in use. It is compatible with Level 2, Level 3 and Nexus from SJ Research and uses a new broadcast packet to ensure that multiple requests of a file are all loaded simultaneously.

It can work with files on any standard media type including Winchester, floppy disc or CD Rom.

The package includes software on disc, Econet and NetFS modules, a ReadMe file with installation details and an instructional sheet. Price, including site licence, £69 plust VAT.

The second new product, ClassROM from Oak Solutions, is intended speed up the delivery of large Archimedes applications to multiple machines. It stores applications locally at each machine using Econet.

Each computer on the network has a ClassROM attached to it which adds two new icons to the icon bar – one representing a read only area where applications can be found and the other a read/write area for users' temporary data.

The manager can update the application or user area of a single ClassROM then use Econet to transmit identical copy to other ClassROMs on the network.

"In tests, we have loaded Impression into 10 Archimedes machines simultaneously in under five seconds", said Oak Solutions' Phil Driscoll.

Oak Solutions are on 0532 502615

New wide range assembler

SAVING the cost of buying individual assemblers and reducing the time needed to learn about numerous different products, Cross-32 Meta-Assembler is a new table-drive macro cross assembler from Baildon Electronics (0274 580519).

It compiles programs for numerous different target processors on any ARM-based computer running Risc OS.lit will assemble source code for many microprocessors, microcontrollers and digital signal processors, written in the original manufacturer's mnemonics. Price, £175 plus VAT.

Slimline power

UPSONIC (0793 875787) have brought out a new ultra slim uninterruptable power supply unit designed to fit neatly under a desktop computer.

Measuring 430mm x 370 mm and just 56 mm high, the Slim Line will protect your machine against power failures and outages. It is capable of providing power for up to 30 minutes.

The 1000VA model offers additional power conditioning, preventing data corruption and hardware damage in a wide range of peripherals including laser printers.

Slim Line comes in two versions, the 350 at £349 plus VAT and the 1000 costing £475 plus VAT.

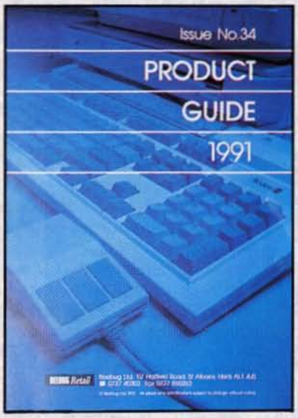
Grab a picture

BILLED as the most advanced digitiser available for Archimedes computers, the new techno-I card from Technomatic (081-205 9558) allows pictures grabbed from video sources to be converted into sprites then dragged to Risc OS applications.

Unlike simple RGB digitisers, techno-I handles colours in 25 bits with 7 bits luminance and 18 bits chrominance.

Software controlled, with no presets or setting up necessary, techno-I costs £249 for Archimedes 300 and 400 series or £279 for BBC A3000. Prices do not include VAT or carriage.

The Product Guide



Issue No.34

PRODUCT GUIDE

1991

Beebug have published a 72 page full colour A4 product guide for users of BBC, Master, A3000 and Archimedes computers. It contains information on thousands of products that are available now for your computer. Whichever system you use, you will find this illustrated and helpful guide to be an invaluable source of information. Everything is covered from complete systems right down to spare parts. As an added feature comparison charts for monitors and printers are provided along with compatibility and upgrade information.

Special Offer on Archimedes Computers

To coincide with the launch of our new catalogue Beebug are making some very special offers on new Archimedes systems.

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Free 1 Mb RAM & 42 Mbyte Hard Drive

The A410/1 is supplied with 1 Mb RAM. At no extra charge we will increase this to 2 Mb and install a 42 Mbyte high speed, top quality, branded IDE hard drive. Should you prefer an 89 Mbyte or 105 Mbyte instead, these are available for an additional £100 or £175 respectively.

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Tutorials for Beeb and Elk

BBC Micro and Electron users now have two new tutorial discs available from Universal Computer Support (0922 30039).

The two courses cover graphics and sound. Part one guides the beginner step by step through various subjects including modes, screen co-ordinates, Basic keywords, simple shapes, solids, uses of PI and square roots, 3D effects and much more.

Disc two moves on to show how more involved displays such as bar and pie charts, sprites, CAD and animation can be achieved.

A small part of each disc highlights how sound and sound effects can be implemented.

UCS is reducing its prices from August, and the new discs will cost £18.50 each or £34.95 for two.

Share a drive

A LOW cost way of connecting groups of Archimedes and BBC A3000 machines to a single hard drive, SCSI Share from Lingenuity (0986 85477), is claimed to transfer files up to 64 times faster than Econet.

Ideally, SCSI Share is designed to connect four or five computers to a single hard drive, but it can support up to seven machines if cable length permits. One application can be loaded simultaneously and existing Econet networks can be implemented.

SCSI Share appears to the user as two hard drives. The first is a read-only partition which protects the application software.

The second is a read/write partition for the individual computer to read and write to as well as providing workspace and storage.

It can work with any size of hard drive, and since it uses standard SCSI interfaces it also allows computers to be upgraded to standalone drive systems if required.

A cluster of four SCSI Share units costs £999 and five units cost £1,175. Both prices include interfaces, a 40Mb hard drive, cables, management utilities and installation. Lingenuity can also offer training sessions.

Pop people try a wild romp

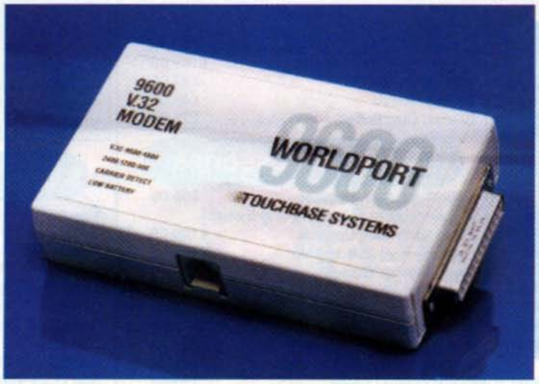
A NEW software label founded by a group of computer artists and pop musicians called Hex and based in London has hit the Acorn market. It is dedicated to producing games for the Archimedes range and the first offering, due out in September, will be Top Banana, which they describe as a wild arcade romp.

"Top Banana is a multi-levelled brain sizzler in which you battle your way through a rain forest, a harsh futuristic cityscape, a not-so-peaceful Temple of Meditation and a mind-blowing psychedelic cosmosphere", said Hex marketing man Robert Pepperell.

Hex programmers responsible for coding and graphics are Karel Dander and Miles Christian. Under the name of Hardwire they have designed computer-based art installations which have been exhibited wordwide.

Providing the music for Top Banana are Matt Black and Jonathon More, two record producers better known as Coldcut who launched the careers of Yazz and Lisa Stansfield.

Contact Hex at 41a Charleston Street, London, SE17 1NG.



Small is faster

COMMS is getting smaller and faster with this new portable modem from Trend Communications (06285 30611). The WorldPort 9600 weighs in at 227 grams and measures just 12 x 7 x 2.5 cm yet provides MNP Class 4 error correction, and is completely Hayes-compatible.

As the world's first battery-powered V32 modem its 9600 error-corrected bits per second allows reliable high volume data transfer. It cuts down phone bills as well as ensuring efficient use of time for the user.

Virus lands pupils in hot water

A COMPUTER prank which backfired on a group of Yorkshire schoolchildren landed them in the hands of the Fraud Squad and led to a severe dressing down from teachers.

The group of computer studies pupils decided to put their knowledge to questionable use by concocting an Archimedes virus which takes over available memory on the hard disc. Purley a nuisance virus, it does no lasting harm.

But things got out of hand when the virus started to spread beyond the school. The pupils are members of a user group and when their home-made virus found its way on to a bulletin board, the matter was reported to the Computer Crimes Unit at New Scotland Yard.

Solving the "crime" caused them no problem since the youngsters had included the name and address of their school in the on screen evidence of the virus. Their actions have been likened to a balloon race. They included their address just to see how far the virus would travel.

The matter was passed on by Scotland Yard to the Fraud Squad of Wakefield Police, West Yorkshire.

"A complaint was received about this Archimedes virus and we have been investigating it under the terms of the Computer Misuse Act", said detective sergeant Keith Sykes. "A number of persons have been interviewed and a report has now been submitted for consideration".

The Micro User understands that prosecution of the youngsters is unlikely. The matter is being treated as a prank and involvement of the Fraud Squad has been sufficient deterrent. A further deterrent is the severe displeasure of teaching staff at the school.

Pupils involved in the escapade have agreed to send off a free cleaning disc to anyone whose machine has been infected by their virus – an agreement which is costing them the price of the necessary discs.

Micros have their human side, too

PEOPLE interested in the human or computer aspects of interactive systems are the target for HCI '91 – Usability Now, which takes place during this year's Edinburgh International Festival.

The three day conference is organised by the Human Computer Interaction Specialist Group of the British Computer Society with support from the DTI.

It will include the delivery of a number of papers and discussions on a wide range of HCI topics and will be held at the Heriot-Watt Conference Centre, Riccarton, Edinburgh from August 21 to 23.

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Orion can supply spares for any machine Acorn have produced mostly from stock. With next day delivery available or you can take advantage of our in house repair service. We can also supply parts for other computers and printers.

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Orion SCSI drives are high speed, typically 750K - 1200K per second, they are extremely quiet, and the external drives come in a small case unlike those of some of our competitors. Price includes SCSI expansion card

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SCSI External (Specify A3000 or A400)

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	Sony Bulk	£12.50	£25.00	£45.00	£106.25	£200.00	£375.00

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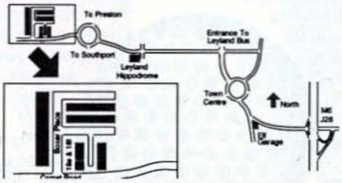

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Dennis on the run

The Mad Hatter continues his exploration of the Drinking Glass world

IN this second part of *Dennis through the Drinking Glass* our hero roams around the realm and mixes with some very dubious company. Ah well, topers can't be choosers.

From Fleet Street, where we finished last month, go east to Wobert Wuncie and give port. Since you are outside St. Paul's Cathedral, you can see a discarded dog collar, so collar it.

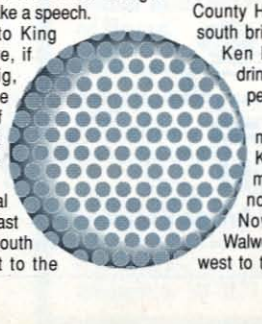
Now go north to Platform 2 of King's Cross Station where an InterCity 125 train awaits you. Catch it and you'll rocket north, past Stevenage.

When you disembark go west to Windscale and drop suit and wear radiation suit instead. West again will get you inside Windscale and you'll see a dirty raincoat. Have a drink to steady your nerves.

Take the raincoat, go east and drop radiation suit. Take the other suit and wear it. Then continue east and north to Yorkshire where Arthur Scargill threatens to make a speech.

Flee west to King Coal and there, if you give wig, Arthur will give you a lump of coal. Have a drink to celebrate.

Take the coal and go back east to Yorkshire, south and then east to the late Pat Wall's Bradford School of Etiquette. Buy Militant and escape south to where – just by chance – Prince Andrew is waiting in a helicopter.



Get in helicopter and you'll be flown by your dashing chauffeur back to Number Ten. Drop the coal and Militant, and have a refreshing drink.

Wear the collar, examine the bed, take the sheets, take the (other) sheets, knot the sheets, take the plus-fours and the golf clubs. Next open the window, go east and have a drink.

Now go south to the Thames and then east to the Bank. Draw out your money go back west and drop the raincoat. Go north, drop the suit and wear the plus-fours instead, go south and have a drink.

Continue southeast to the golf course and look in the hole. Take the mole that you find and carry on west to the groundsman's hut and take the lawnmower. Now go back east to the golf course then northwest and north to the garden. Drop the lawnmower here and have a drink.

Swap the plus-fours for the suit and dump the golf clubs, grab the lawnmower again and set off for County Hall. South, south, up and south brings you face to face with Ken Livingstone – so have a drink by way of compensation.

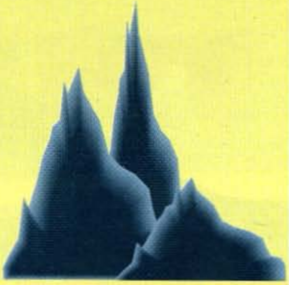
Drop the lawnmower and take Ken then lift the lawnmower again and go north, down and north. Now go southwest to Walworth Road and then northwest to the Labour Party den and the ci-devant Viscount Stansgate. Give Tony Benn the truss and he'll offer a white flag in exchange. Have a drink.

Lastly – for this month – take the flag then go southeast followed by north to the De Montfort building. Now drop the flag and go west to meet Denis Healey: Cut eyebrows – it's better than being savaged by a dead sheep, or even by a rottweiler in drag, Denis.

Drop lawnmower and go southwest to the Liberal headquarters. You'll hear shouts of Kinnock, Kinnock so enter Who Is It and have a drink.

(To be concluded next month)

On the rocks



I left you last month on the rocky outcrop, having just used the giant Sandworm to wipe the smile off the face of the Sphinx in **Adventure Quest**.

In spite of having made the pyramid accessible, we need to ignore it for the time being and move north instead to the wadi where oil seeps from the rocks. Ignore this for the moment and continue north to the foot of the mountain.

Four moves north and two west bring you face to face with a giant who is munching the bones of his last victim. Here is where the sling and silver ball really come into their own. Wave (or Swing) sling is the required input at this point.

The giant rushes off, muttering something about going to get his helmet, but he doesn't reappear and you can safely discard the sling.

Now go west and up the sheep track until you can see the stone tower below you and the orcs surrounding it.

A further move up brings you to the giant stones, orcs for the mangling of, which you must ignore for the present since trying to push them is a waste of energy.

Three more moves up bring you to the Abominable Snowman chained to the mountain. Once you have unlocked him he dances for joy and is your friend for life. Don't worry about the cave yet – it's dark and dangerous – drop the keys instead and then get Snowman.

Go back down to the giant rocks and give them a push. The Snowman will come to your aid, and the orcs are finished off in a most satisfying manner. The Snowman will now go off about his own business while your job is to go back down the mountain to the wadi.

Four moves west bring you to a stone slab which blocks the way north, and you are also likely to receive a message indicating the first signs of thirst.

If you try to push on westwards you discover that it is a dead end, so the slab has got to be shifted somehow. The scenario of wadi and oil suggested to me an eastern solution – so I tried OPEN SESAME, and blow me if I hadn't got it right first go.

Inside the cave that is thus revealed is a sun dial and nothing else: Ali Baba got there before you and left a message to this effect.

Now it is time to make your way back to the brick building, where you should refill the bottle from the well and take the talisman and the pipes.

Once equipped, you have to cross the desert again – don't forget to LOOK from time to time to foil the worm – to the pyramid. Climb it by moving north and you'll be surrounded by poisonous snakes. Don't worry, though, all you have to do to soothe the serpents is play pipes and they'll go back into their holes.

Enter the temple and the goddess will gratefully relieve you of the sun dial and let you have a ruby by way of recompense. You might as well leave the pipes here, too – they are of no further use.

It's time to go back to the wadi, where you should empty the bottle by drinking the water, and then fill it with oil.

And that's where I'll leave you for the moment.

(More next month.)

Elite Tips

Paul Downs has written in with a small amendment to David Waine's Elite Commander Display utility published in the March 1989 column. The aim is to improve the screen display.

Change line 170 to:

```
170 INPUTn$:UNTIL LENn$> ""
```

Make line 210:

```
f$=":"+STR$dr%+".E."+n$
```

Lastly replace *f$* with *n$* in lines 230 and 360. Paul would like the display to show the credit balance as well, but he can't locate the address – can anyone help?

Elite is coming for the Archimedes! Lovely solid graphics, moons as well as planets, and masses of missions. All the ships you'd expect plus loads more.

Some of the brand new ideas are: Flocking pirates – a special algorithm is used so that groups fly together, like a flock of birds. Ships will try to avoid head-on collisions and pirates will attack other ships, not just yours.

How do I know all this? I've seen an early version.

Problem Corner

Matthew Taylor has written in to say that he enjoys playing the Zork series of adventures on his A3000 running the PC emulator.

However, he can't pick up the platinum bar that's located in the echo room in **Zork 1**. It just so happens that, while I have just ordered the Zork series myself, they've not yet arrived. So can any reader help?

Matthew also wonders what the rainbow turtle is for in **Enchanter**.

Hatter's Helpline

That brilliant Magnetic Scrolls tour de force **Corruption** keeps a number of readers puzzled. Maxton Carter offers – and asks for – help.

First, the offer: To prevent the BMW from blowing up he suggests starting the engine quite early on in the game.

Now the query: Maxton tends to get bumped off in the early part of the evening. I suspect it's because he hasn't told the police – and shown the evidence – of Charpontier's dirty deeds.

While dealing with **Corruption**, John Terry has some questions and comments too. He asks if anybody has found a use for these items: Camera film, cutlery, deckchair, ledgers, letter, litter, meal, menu, mirror, receipts and salad. John has completed the game but with 175 points, which suggests some things still left to do.

He has some suggestions for those wanting a cheap laugh: Rub somebody with the soap, kiss David or one of the women and try to catch the ducks or take the deckchair.

Another Magnetic Scrolls teaser is **Fish!** and Colin Batchelor offers a number of hints for part two of the game in the city of Hydropolis.

- The focus wheel – assembled in the first part of the game – can be found on page 156 in the book in the library. Putting the page in the protocopier will reward you with the component.
- If the protocopier, the light in your apartment and the large switch at Battersea are all switched off, the pressure door at the power station will open.

However you only have a limited number of moves in which to enter the tunnel before the guard throws the large switch. This also controls the underground system, so be prepared to wait at the station.

- The sachet of plankton is the alarm system for the museum. Opening it in the alarm room enables you to see the star exhibit.
- A suitable case for xthe device may be obtained by buying back your fishton at Steve's second-hand shop, and then returning to your apartment where you should find a radio case.
- Try asking Ernest Chubb to the disco – but remember to wear your sunglasses and earplugs.

Colin is having problems getting on to the tower roof. He realises that a lifting device is required, but failed to get the hang glider. Try ballooning instead: A bag and a cylinder might help here.

The cylinder is to be found inside the dark warp, which is a fiendishly difficult maze affair. The best tip I can give is to say: Forget it's a maze. You need an odd number of exits, so if there aren't, go Up.

Next tackle the corners, the open edges and any corners that open. After that Up should provide the cylinder and Up again a way home.

Two readers – Mumford and Walker – have written to say that they are jinxed in **Jinxter**. Their problem is getting from the mountain to the castle – and the Unicorn seems unmanageable.

This is what to do: Put the saddle on the unicorn, mount the unicorn, doofer the unicorn. I have a feeling that they were very close to the solution, but perhaps used unacceptable input.

They also seem to be having problems with the clockmaker's workshop: If they oojimy the stool things might improve.

A reader who assumes the disguise of Bilbo is stuck in that old classic **Castle of Riddles**. What's more, he's stumped by a riddle: Little Nancy Etticoat, with a white petticoat, and a red nose. The longer she stands, the shorter she goes.

Well, when our home was deprived of electricity for three days after the winter storms some 18 months ago I was glad of some Nancies by whose light I could read.

Hall of Fame

Grateful thanks to John Terry for a complete solution to **Fugitive's Quest**.

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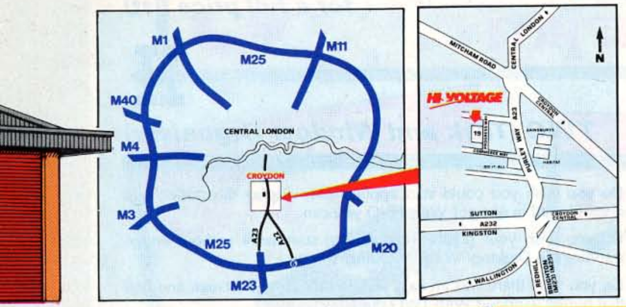

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MU8

Summer price cuts! ideA

The *ideA* range of hard disc upgrades is being welcomed as the best way forward for Archimedes and A3000 users. "IDE is the small-computer drive standard for the future," says RISC User. "ST506 is on the way out; SCSI has only a limited future in the small drive market."

PERFORMANCE

IDE is the only true 16-bit hard disc system currently available for Archimedes computers. All data transfers are 16-bit all the way from the disc, through the interface, to the computer (except that the A3000 internal interface has an 8-bit link to the computer).

FLEXIBILITY

An *ideA* system can turn your A3000 into a 20, 40 or 60 Mb workstation with no external attachments, using hard discs which sleep quietly during periods of inactivity.

The *ideA* system caters for two low profile hard discs in the same internal or external housing, allowing you to build up your capacity in easy stages without wasting money.

Then there's the *ideA* 'hard card' option – a 2½-inch hard disc on a standard podule.

VALUE

We think *ideA* upgrades offer the best value for your money, and we aim to keep it that way. Advanced IDE disc technology means simpler, cheaper, more reliable interfaces. Manufacturers' prices for hard discs fall gradually, and we pass these savings on to you as soon as we can.

Our upgrade prices include controller cards and fans where needed. Our disc cases are of metal construction.

RELIABILITY

The first *ideA* customers have been using the system successfully since last year. The A3000 internal hard disc is particularly reliable – not one has had to be returned to us.

The latest IDE discs are ruggedly designed with lap-top and portable computers in mind. You'll wait a long time to see a defect! A skilled service team is ready to back up our guarantee should the need ever arise.

COMPATIBILITY

The Micro User reported "no difficulty in running all fully RISC OS applications". Our IDE filing system is no different from ADFS in use, though it has a few extra features such as the facility to write-protect a hard disc. DOS partitions can be created for the PC Emulator.

CONTINUED SUPPORT

The coming months will see the introduction of many new IDE products, including tape streamers and removable discs. You may rest assured that our software and hardware will keep pace with these developments. Updates for existing users, if they ever become necessary, will be simple and cheap.

"A beautiful solution," said BBC Acorn User. Study our special summer price list overleaf, and let us solve your storage problems too.

Be in at the beginning!

QuicKey

Do you have trouble remembering what twelve function keys do, with and without Shift and Ctrl, in twenty different applications?

Do you enjoy watching PipeDream insert a column when you thought you were saving an Impression document?

Up to now the best way to organise function key strips was with one of our Arckeys.

From now on you may never look at a function key strip again.

QuicKey shows 36 function key combinations on your screen. All at the same time, using the minimum of screen space, even in mode 12. You can choose any of these (plus Ctrl A, Ctrl B etc) using only the mouse.

QuicKey knows which application is waiting for input and will show you the appropriate function key definitions - automatically!

No more mis-directed key presses, because you can see what you're going to do before you do it. QuicKey costs only £10 + VAT and comes with a range of popular definitions (including Edit), to which you can easily add your own.

You only have to lift your finger!

Other products too good to miss!

(See our other advertisement for a full price list)

TWO (Task and Window Organiser)

Do you wish you could start applications, display directories, and open files all in one go? With TWO you can.

Do you wish your pupils were able to start work without understanding the Desktop? With TWO they will be.

Do you wish there was an easy way to tidy up your screen and find that buried window? With TWO there is.

TWO is far more than a 'sticky backdrop'. Its easy-to-use features make the Desktop a friendlier environment and will really save you time.

DrawBender

DrawBender distorts Draw files to follow a shape of your choice. A useful addition or inexpensive alternative to other graphics software, supplied with these **three** decorative fonts.

DrawBender is simple and enjoyable to use, with no complex menu structures. Yet it produces results of a superior quality using an iterative reparameterisation algorithm. The example above uses DrawBender with **FontFX** – the two make ideal companions.

AnDi *Oddule*

Baildon Electronics Oddules open the way to cheap, flexible and almost unlimited external expansion via the I²C bus already supported by RISC OS. Baildon are producing a range of Oddules which may be daisy-chained.

Ready now is the ***AnDi*** Oddule. It has eight digital I/O channels with high current open collector drivers, four A/D inputs, and one D/A output. AnDi is capable of emulating user and joystick ports, allowing ADVAL operation from BASIC, and the use of Concept Keyboards and analogue or digital joysticks.

Cross-32 Meta-Assembler

This professional table-based cross-assembler works with over 50 target processors (including ARM2 and 3), and has been used for some time on PCs. A RISC OS Desktop version by Baildon Electronics is now available. Cross-32 is user-friendly and supports conditional assembly and macros. Output is in absolute binary, or Intel or Motorola Hex formats (ideal for eprom programmers and emulators).

You can modify the tables supplied or add new ones to cater for new processors and opcodes.

Ian Copestake Software

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Update

Easier Arc art

TOPOLOGIKA (0733 244682) has developed its latest Archimedes/BBC A3000 product to meet the needs of users who find some existing art packages hard to handle.

Called Imagine, it's billed as a "design pack" because it has applications right across the curriculum including Art and Design, Maths, CDT, History and Geography.

From Peter Killworth of GiantKiller fame, Imagine features twin screens, has built-in maths facilities and on-screen help. It turns the whole screen into a painting area with intelligent menus easily accessible through mouse commands.

The program remembers previous options and can be configured to suit different needs and abilities. It can even be made simple enough to follow on from its sister program TinyDraw.

IMAGINE
Peter Killworth

Standard design features include eight different brushes, rubber banding, text, copying, spray, fill, magnify, screen saves and printing. Users can paint on two screens at once with 256 or 16 colours and special Maths features include turtlelogo, tessellations, shapes and symmetry.

For use on a standard 1Mb Archimedes of BBC A3000, Imagine comes on two discs and costs £39.95 including an easily understood manual. Available separately for £9.95 are packs of images produced using the program. Now out are Pirates, Victorians and Romans with others planned.

Primary pictures

A NEW 256 colour art package designed for use with primary and special needs children has been announced by Minerva (0392 437756). PrimeArt includes menus which can be tailored to suit a particular class or individual child and on-line help which makes it easy to use.

Pictures can be saved, allowing a class to break off a project then continue later. Sprites can be imported and saved in a viewing window which allows pupils to browse through the sprite library before making a choice.

They can then be placed anywhere on the screen, rotated or resized so interesting combinations can be created.

Among the various printing options is a poster format which spreads pictures over four pages so they can be joined together into a large poster.

For use with Archimedes and BBC A3000 machines, PrimeArt will load any Risc OS font allowing children to easily re-size text and place it anywhere on the screen. Pictures are saved in compressed format allowing more to a disc. Price, £79.95 including primary licence.

Prep time truncated

A SERIES of resource packs designed to cut down teachers' preparation times have been produced by Sherston Software (0666 840433). Although intended to support Sherston's titles, they can be used alone for topic work in primary schools.

Each pack includes up to 70 photocopyable worksheets covering structured language, maths, logical thinking, problem solving and open-ended research.

Now available are Join in the Teddy Bears' Picnic, Let's Visit the Farm and Studying Nature Park Adventure. Planned for later this year are Toby at the Seaside, Zillion and Space Mission Mada.

The packs cost £13.95 and are available on 28 day free approval.

Schools dig Acorns

ACORN has further increased its grip on the education market. According to a report from independent market researchers Taylor Nelson, 74 per cent of schools buying computers bought Acorn during the last three-quarters of 1990.

The survey shows that nine out of every ten primary and secondary schools now have Acorn machines and that just under 70 per cent of computers in UK schools for curriculum use are Acorn machines.

In addition 82 per cent of Local Education Authorities positively recommend Acorn computers for use in their schools, with 72 per cent specifically recommending the BBC A3000 to first time all buyers.

Touching Special Needs

FOR the first time, Special Needs teachers will soon have a choice of touchscreens. The only one currently on the market is Microvitec's Touchtec, but Brilliant Computing is evaluating a new product – Touch Window – developed by Sherlock of Norway and imported by Lindis International.

To be available from September at a price around £235, Touch Window is a flat clear plastic sheet in a light frame which fits on to the monitor with Velcro fixings. It plugs into the serial port on the BBC A3000 and will be supplied with separate mains transformer.

Once set up, a light touch on the clear surface works the computer. It is capable of producing fine discriminations and is supplied with a stylus for even finer artwork. But while Touch Window can access mouse software, it does not have the accuracy of a mouse.

One advantage of Touch Window is that it will fit any monitor including the Phillips one which was supplied on many Archimedes systems.

Another plus is that it can be used flat on a table or desk for producing artwork, tracing outlines or with suitable software like a concept keyboard with the screen on top of the overlay.

"We are very enthusiastic about the Touch Window and will soon have a number of our programs, starting with Touch Games and Switch On, running on it", said Brilliant's Nick Pronger. "Our only reservation is that it could be broken if dropped or trodden on and it may also scratch.

"Microvitec have enjoyed a virtual monopoly in the educational touchscreen market and we are the biggest single dealer in their product.

"We will continue to offer their Touchtec along with the Touch Window which will come with utility programs, an art program and our Touch Games. For the first time, our customers will have a choice".

On the Special Needs software front, Brilliant (0274 497617) have now converted some of their BBC Micro and Master programs to run on the BBC A3000. Switch On, Switch On Travel, Everday Signs and First Steps are already available at £20 each. September will also see BBC A3000 versions of Joystick Games 1, Touch Games 1, Streetwise and Switch On Actions.

Despite A3000 developments, Brilliant remains committed to the BBC Micro and Master. Due out in September are Katie's Garden, a recognition program developed in conjunction with speech therapists, Hillside Games, a set of graphics-based programs developed by Nick Howard of Hillside School, East Sussex and Ted Steps Out, a continuation of Ted's Adventure.

What big eyes you have

Shelley Birchenough examines an updated BBC favourite

Selective Software
An educational
ADVENTURE
For the Archimedes and A3000 computers
LITTLE RED RIDING HOOD
I'm off to see Grandma
for ages 5 to 8
along the way she makes lots of friends
almost at the cottage..
but just around the corner..!
Teacher's Manual
100's of ideas inside ...

Product: Little Red Riding Hood
Price: Special offer. £15 inc. P&P
Supplier: Selective Software, 64 Brooks Road, Street, Somerset BA16 0PP.
Tel: 0458 43079
Requirements: BBC A3000 and Archimedes range

ORIGINALLY produced for the BBC B, Little Red Riding Hood has always been one of my favourites for middle infants – year one – through to first year juniors – year three.

In the new Archimedes version, the program has been extended and enhanced. The graphics are worthy of a special mention as they make use of some impressive effects, most notably the approaching wolf and the moving caterpillar.

Following the usual adventure style, the children accompany Little Red Riding Hood on her journey through the forest to see Grandma.

You'll come across the traditional characters of the wolf and woodcutter, but the storyline diverges from the fairy tale as Red Riding Hood meets several others animals and puzzles on her journey. Solving problems correctly will allow you to continue on your way.

The scenario is divided into two parts with the traditional and familiar tale taking precedent in the first section while the second part begins when you reach Grandma's cottage.

Instead of having been eaten she's been captured by an evil giant who is holding her prisoner in a castle. By visiting locations on a map you'll collect the necessary items for Grandma's rescue.

Red Riding Hood is the heroine in this version, and the woodcutter is reduced to a mere mortal, unable even to count trees without help.

It is very simple to use. Children use the mouse and number keys while the teacher only has to cope with the spacebar and mouse. The accompanying set of teacher notes has been carefully thought out and includes the necessary links with National Curriculum Attainment Targets – a must for the busy teacher.

There are also some excellent follow up ideas for the main curriculum areas which could be used to turn the program into a full half term of topic work. The manual also includes superb photocopiable worksheets which are well explained.

Most of the problems posed are mathematical and use a variety of approaches. There is an option at the beginning for the teacher to set limits on the numbers to be used, giving the choice of number bonds up to 50.

Problems requiring addition, subtraction and multiplication are covered, together with "truth sets" where children need to fill in missing signs.

The individual child can control the flow of text which is very useful for slower readers or groups. The accompanying music is pleasant and tuneful – it's possible to leave the sound on the loud option all day and still not detest the tune.

My children loved the graphics and tried to draw similar pictures themselves and I appreciated the way this package is designed to help develop a sensitive approach to the environment.

The amount of reading required can be rather excessive for the younger age range, but it is possible to find ways round it by either choosing groups carefully or by the teacher helping from time to time.

Several of the problems posed come as a surprise as they require recall of information already given. This is easy enough when asked a direct question such as: *Who stole the bluebird's eggs?* But when asked: *How many prickles did the hedgehog have?* or asked to identify a *Little One* from a crowd, both children and

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Into the time machine

A solution, or an application looking for a problem? Shelley Birchenough investigates

Product: Time Traveller
Price: £40 + VAT
Supplier: ESM, Abbeygate House, East Road, Cambridge CB1 1DB.
Tel: 0223 65445
Requirements: BBC B, B+, Master

THIS database history package attempts to use IT to enhance children's historical understanding. It optimistically states that it can be used with all ages, though in my opinion it's best suited to children over nine. However, this approach has led to a mismatch between the language used and the information covered.

Presentation is very impressive, with a large black binder providing pockets for the three discs, and the teacher's handbook and user guide are printed to a high standard. It is, however, unfortunate that the occasional grammatical and spelling mistakes have managed to creep through the net.

Generally speaking, the handbook is written for the average computer-phobic teacher, but it is prone to tossing in the odd piece of jargon to confuse you completely. The instructions mention the real basics of putting in the plug and inserting *the program disc in the disc drive with the label uppermost and the small cut out notch on the left hand side.*

But in the very next paragraph you're told to *protect the original disc with a write protect tab* which is enough to strike fear into the hearts of those same teachers.

I was also surprised by the condescension of such comments, as in Beforehand advice section: *Knowing what the program can do will help you to plan your lesson.* Do ESM honestly believe teachers would try to use software with children in their classroom without having looked at it very carefully themselves first?

The idea behind the program is fairly original, but the actual software would have limited use in the classroom. Basically Time Traveller is a database for historical facts laid out in the form of a time line. Time spans range from yearly through to teachers can be caught out. One complaint is that the program is patronising at times. By asking the child to make a choice – *Do you want to go with her?* You should expect a negative response from time to time. The response to that is *I'm sure you do really*. No choice at all would have been better.

I also found that now and again the response needed lacks logic, for example when asked to give some food to the elf. But as several guesses are allowed, this is not too much of a problem. Unfortunately, the second part suffers from laboriously repetition with Red Riding Hood strolling across the screen.

The writers have used an unusual method of clearing the screen – things split into tiny pieces and vanish, but it would have been better if it was more varied.

The random messages which appear when the child returns to a location already visited also suffer from repetition – I only encountered two different ones. These are all minor problems which do not really detract from the program, but do stop it from being a classic.

Summing up

A well-known idea has been used in a refreshing and original way to add a new dimension to an old story. This version is a good development of the original software and I would recommend anyone working with five to seven year olds to take a close look at it.

Computer paint

Rog Frost examines the pros and cons of a new object-based drawing package

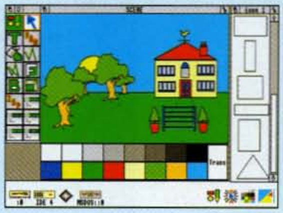
Product: Picture It
Price: £49 + VAT
Supplier: Appian Way, 34 Quebec Street, Langley Park, Durham DH7 9UU
Tel: 091-373 1389
Requirements: BBC A3000 and Archimedes range

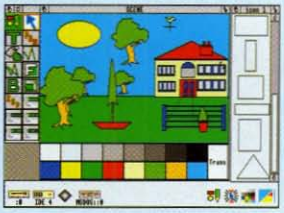
YET another drawing program for the Archimedes? It surely can't need any more – or at any rate it must have a lot to offer to make people consider buying it.

Appian Way software are well known for their historical software in education. What has made them take a giant step into this totally different field?

The answer is that they have devised a superb product. It is an art package which is not based on sprites, but on objects. It might almost be said that Picture It is an education version of !Draw. Indeed, the pictures created are !Draw files and can be loaded into Acorn's famed program or into any other DTP program.

The exciting part of Picture It is that the nitty gritty has been done for you. Before you start creating you load in a curriculum area file which contains a large collection of relevant shapes. The demonstration disc files consist of houses and ships. Others are promised, including worship and geography.





When you buy the program you select the two areas you want. Further curriculum files can be bought as extras. If the available files do not meet your needs they are very easy to create using !Draw. In school it is possible to find good artists to produce shapes for all to use.

You load Picture It in the usual way by double-clicking on a suitable icon. This presents an attractive desk top which gives access to all of the featuress.

Having loaded the program, the required files of shapes can be dragged to the right of the main display ready for use. The files for houses contain wall sections, roof shapes, large collections of doors and windows, chimneys, trees and garden ornaments.

Any can be positioned by dragging with the left mouse button or rescaled by use of the right button.

Below the display is a 16 colour menu. When you click on a colour, the pointer pulls a blob of it around. Click in a shape and it is instantly coloured.

Some demonstration picturest show the effectiveness of instant colouring by creating the same scene in different seasons of the year and with different light effects.

To the left of the main screen is the on-screen menu, which gives access to all main drawing and filing options. Firstly, there is the save icon. Click

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decades and centuries.

The aim is to help children understand concepts of time and change while teaching them the skills of handling information and sequencing.

To be of real use with younger children, it would be necessary to use time spans of days, weeks and months rather than an eighth or more of their lifetime. ESM have obviously forgotten how slowly time passes through the eyes of a young child.

However, the Hundred Years of History data disc which accompanies the package would be particularly useful to schools about to celebrate their centenary or similar anniversary.

Time Traveller is a very tidy and easy to use package if you want a database specifically designed to chronologically store facts.

Some of the *happening of the year choices* in the file have been selected using strange criteria. For example, the event of the year in 1923 is *White horse saves cup final.*

Searching the database is rather laborious as you need to scroll through all the information to find when various events occurred.

The pack also includes a Getting Started Exercise Card and a Help Card which are useful to leave with capable pupils once the rudiments of the program have been explained. The program optimistically suggests that children should work in pairs to produce their own time lines. Yet in reality groups of four work better and allow access to the computer by more children.

Once pupils are familiar with the basic workings of Time Traveller they can link parts of time lines together and measure intervals. It's also possible to print out chosen pieces of text – always useful for wall displays.

Time Traveller
YEARS
DECADES
CENTURIES
TEACHER'S HANDBOOK
Homerton College, Cambridge
1911
1916
1929
NET
ESM

Summing up

At the end of the day Time Traveller is a package you would have to consciously remember to use, while schools without it probably wouldn't miss it. I can see it having much greater appeal to – and usage by – parents in the home working with individual children on the history of their own family than in an educational establishment.

ARCHIMEDES *A3000* PRODUCTS

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20Mb hard disc (A3K7) – A 20Mb hard disc drive ready to fit in A3K2, including the hard disc card and all cabling. We are not aware of any other hard disc upgrade that is treated as an internal upgrade (consult your Acorn dealer or call PRES for details).....£399.00

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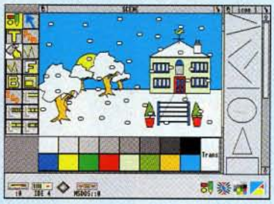
this and a standard save box appears so that works of art can be stored on any disc.

Next comes the basic pointer for grabbing shapes from curriculum files. Then there is an option for text entry which seems to give access only to the system font. This could be changed by loading into !Draw or a DTP program.

POW is used to clear the screen, while ZAP allows one object to be removed from the page. Then there are the wonderful F and B options which allow objects to be moved to the front or into the background. This is where the object-based drawing programs win handsomely over the sprite packs.



There is a slightly unusual zoom option which allows objects to be resized while keeping the same width-height ratio. As in !Draw, it is possible to create open or closed shapes by selecting appropriate icons. By holding down the select button the pointer becomes a freehand nib giving you five possible line styles. If the menu seems too complex for young users, more advanced features can be removed from the display.

I did come across some areas with room for improvement. Picture It has no print option. I'd like to see a system where hitting the print key produced a dump to a Risc OS printer.

Of course, scenes can be printed by loading them into !Draw or a DTP package. Similarly, a simple one key save option would be a useful addition.

Summing up

Picture It is a must for all primary and secondary schools and could also find a niche in the home market. Appian Way have come up with a truly first rate product here. An ideal tool for education which is certainly very easy to use.

You will not produce world-shattering masterpieces, but youngsters can spend time being creative rather than struggling to cope with basic shapes.

A mathematician's dream

Rog Frost looks into a new way of approaching graphs

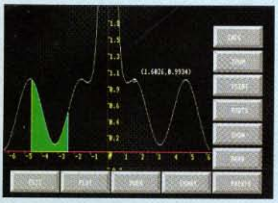
Product: FX – Maths Package
Price: £19.99 inc. P&P
Supplier: Silica Software, Mallards, Lower Hardres, Canterbury, Kent CT4 5NU.
Tel: 0227 70279
Requirements: BBC A3000 and Archimedes range

WHEN I first received this program for review I thought it was going to be all about those mysterious *osbyte* calls which feature on Acorn computers. In fact, it is nothing of the sort.

FX is a program for drawing graphs from an entered formula. The graphs can then be stored on disc, either as formulae or as sprites, and can be printed on to paper.

It is very comprehensive – enter just about any function and a graph can be drawn. The basic idea is that a formula is entered starting with *y=*, you can then type in whatever function of *x* you want – hence FX.

Powers of numbers with no limit, trigonometrical functions – sin, cos, and so on – are all available. Graphs can be cartesian or polar, normal, parametric or explicit. All this gives it the makings of an ideal educational tool, and with the processing power of the Archimedes even the most complex functions are rapidly plotted.



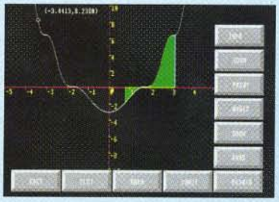
But there is more to the cleverness of this program. As might be expected, you set the range of the graphs or you can leave it to the computer. For instance setting a range of *x* from -10 to +10 and *y* from 0 to 100, it's possible to zoom in on a part of a graph by drawing a box around the required section. Unfortunately, there is no easy way to zoom back out again.

A feature which will be found very useful in schools is the ability to vary constants, which sounds like a contradiction in terms. In practice, the original function could be entered as y=mx+c. Then the value of c can be set to alter between limits of -5 to +5, for instance, and 11 different graphs are then all drawn on the same axes. It shows speedily and graphically the effect of changing the value of a constant.

You'll find that it's possible to identify the co-ordinates of any point on a graph merely by pressing a button. These can be shown just for the time the button is pressed or retained on screen. Sometimes though, a rather untidy mess is left when a co-ordinate is removed.

The area under a graph can be computed by moving a pointer along the x axis between two points. More accurately, you can type in the required limits for area calculations.

Two methods are used to calculate the answer and both results are given. FX can also find the roots of a function. It does this by a *guesswork* method and may not always give the answer you'd expect. While FX has many good features, I feel it is flawed by some rather sloppy programming. The first problem concerns printing. The program is designed to print with Epson-style dot matrix machines.



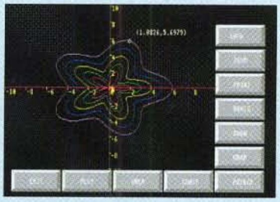
The screen colours can make the result rather hard to interpret, but more seriously, the printout chops off the right hand edge of the display – the place where information about the graph is kept.

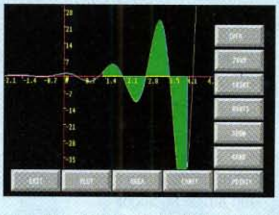
Even worse, the program often fails to recognise that my totally standard printer is there at all and reports an error.

Though the saving process works, it's cumbersome. As FX is not multi-tasking and occupies the whole screen you don't have access to the DeskTop. So to save a graph as a sprite it must first be grabbed and the data stored by the computer. Then the program has to be shut down by pressing Escape.

Now a standard Risc OS save can be made from the FX symbol on the icon bar. Saving functions – up to 20 in one file – is done in the same way. If you have 4Mation's Snippet you might find saving screens via that an easier option.

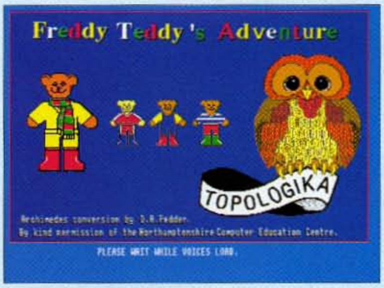
My last major complaint concerns the way the mouse-controlled pointer moves in unexpected ways when a menu option is chosen. This repeatedly surprised me, with the result that I was selecting a menu and then moving the mouse a fraction, so closing it all down.





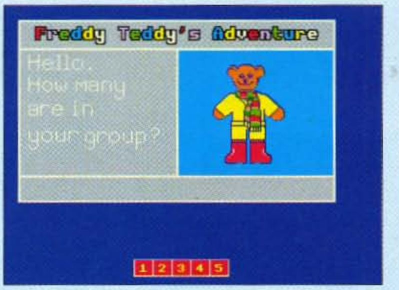
Summing up

The package would be better were it more Risc OS standard. I found that very little was intuitive and I had to keep referring to the manual to know what to do next. FX has many first rate features and will fascinate mathematicians, but it is a pity that the quality of the programming lets it down.

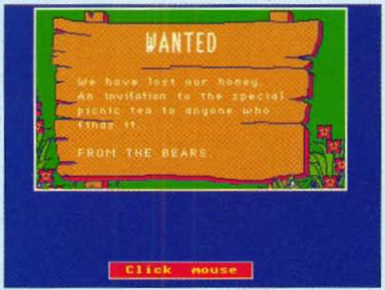

Freddy Teddy's Adventure

Archimedes conversion by D.R.Pedder.
By kind permission of the Northamptonshire Computer Education Centre.

PLEASE WAIT WHILE VOICES LOAD.


Freddy Teddy's Adventure

Hello,
How many
are in
your group?


WANTED

We have lost our honey.
An invitation to the special
picnic tea to anyone who
finds it.

FROM THE BEARS

Freddy Teddy strikes again

Product: Freddy Teddy's Adventure
Price: £19.95 + VAT
Supplier: Topologika, PO Box 39,
Stilton, Peterborough PE7 3RL
Tel: 0733 244682
Requirements: BBC A3000 or Archimedes series

Marshal Anderson follows Freddy on his latest outing

THIS is another conversion of a Nimbus program from the Northamptonshire Computer Education Centre. Re-programmed by David Pedder for Topologika to take full advantage of the Archimedes' graphics and sound, it follows the theme started with the Freddy Teddy program published earlier this year.

This new program deals with counting and problem-solving skills fir the pre-school/lower infant age range though the reading content really requires an older child or adult to be present.

The opening options allow you to set the maximum number the program will use, from two to ten, whether the game is short, long or has no time limit and the number and gender of the children using it. The latter option is really for the children to set up.

A further option lets you choose between using the mouse or arrow keys and spacebar. The ability to change the mouse-step would have been a nice addition.

This is useful when dealing with young children whose fine motor skills are still at the lower level, although most Archimedes users are capable of changing this themselves.

Once into the game we are presented with a picture menu of eight locations. Visiting the bees first, you'll hear just a buzzing noise to begin with. Next you come across a path with a notice telling us that the bears have lost their honey and that the finder will get a special invitation to the picnic.

Now we find a tree where the squirrel has lost its nuts. To find them we must click on parts of the tree, where we find more squirrels, butterflies and a bird's nest. There is a hedgehog on the ground as well as the nuts.

If you are having trouble you can go back to the menu and see the owl which will tell you where the nuts are. The nuts change hiding places each time you play.

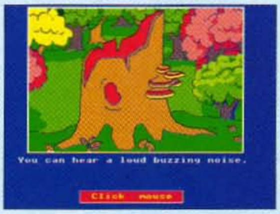
Travelling on to the forest clearing, you play Count the Bears. You need to know how many bears there are so that Freddy Teddy makes the right amount of sandwiches for the picnic. The bears appear one at a time, so this is a slightly more taxing task than simply counting the objects on screen.

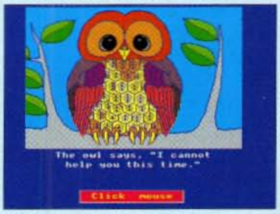
Now we are allowed into Freddy's garden. He needs to know the time that the picnic will start. A quick trip back to the owl and he will direct you to a clock in the garden – a dandelion clock. Count the number of times Freddy blows it and you'll know the time of the picnic.

Heading back towards the bees you'll discover that they are off collecting pollen so we can get some honey and go to the picnic.

Having found the squirrel's nuts, counted the guest bears, discover the time it starts and relieved the bees of their honey you are asked to complete an invitation with the number of bears, boys and girls, start time and the gift.

This comes as a bit of blow the first time the children played – it's amazing how much concentration is need for each activity and just how quickly the results are forgotten, unless they are told to remember.


You can hear a loud buzzing noise.


The owl says, "I cannot help you this time."

So off we went again noting and remembering the details we needed. Complete the invitation correctly and the party starts and a nicely animated Teddy Bear's Picnic plays with music to match.

The time limits set at the start are a bit fierce. The winter option – fast because of the shorter days – is not really recommended even for children who have completed the game before.

The menu structure is fine. You can always get back to the bit of the program you want – except the set up part, for which you must restart.

Graphics and animation throughout are well finished and strike the right note for children of the target age. However, this program is only likely to work with young children, as any from mid-infant up will probably find it patronising, so special needs use will have to be considered carefully. The support materials include a letter from Teddy and a colourful reading/counting book which uses graphics similar to those in the program. The teacher's guide is straightforward and to the point.

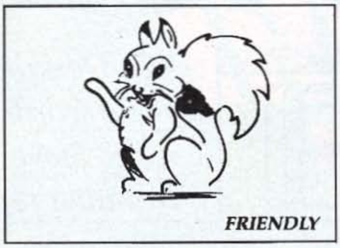
Summing up

The whole program is easy to use for very young children under the direction of an adult or older child. A nice touch is that the children are asked if they have completed a task, rather than the program just barreling on. If they haven't completed it they are told to do so.

An excellent package with a great deal of potential in the reception and lower infant classroom. Possibly not as suitable for home use considering the value one child would get out of it for the price.

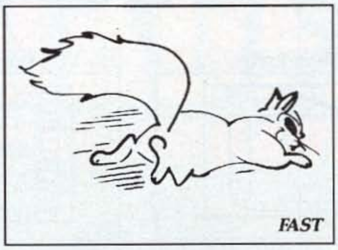
SQUIRREL

THE REVOLUTIONARY NEW DATABASE FOR ARCHIMEDES COMPUTERS



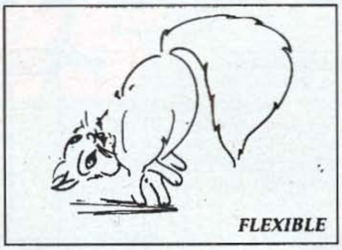
FRIENDLY

Squirrel is the easiest to use database yet, allowing simple point and click database creation and queries.



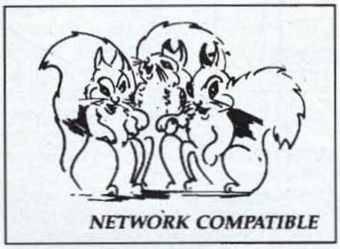
FAST

Modern indexing techniques mean superfast searches every time.



FLEXIBLE

Images, text and sound may be stored in the same database



NETWORK COMPATIBLE

Client/server design ensures that squirrel runs just as well on networks as standalone.

INTELLIGENT

Squirrel understands days of the week, months of the year and recognises files from other popular packages.

COMMUNICATIVE

Queries may be made onto other popular computers such as an IBM or Macintosh, even remotely over telephone lines.

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From hot lead

Was Desktop Folio worth the wait? Steve Bruntlett reports

Product: Desktop Folio
Price: £90
Supplier: ESM, Abbeygate House,
East Road, Cambridge CB1 1DB.
Tel: 0223 65445
Requirements: BBC A3000 and
Archimedes range

ESM's latest offering brings the company's very successful Folio up to date for the Archimedes but goes much, much further. DeskTop Folio comprises of two pieces of software: Simple Screen Folio and DeskTop Folio.

Simple Screen Folio provides the link between the much used school focussed word processor Folio and desktop publishing. DeskTop Folio is boasted to be an easy to use word processor and desktop publishing system with facilities for interactive publishing.

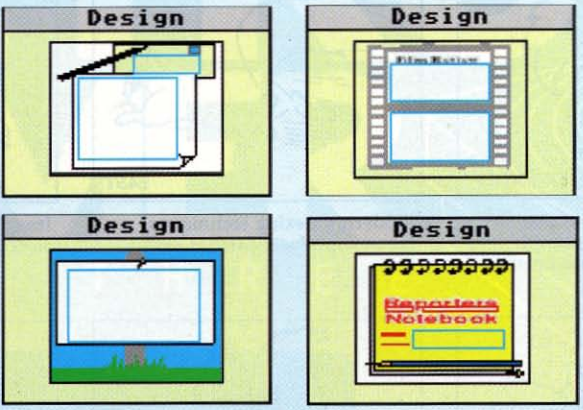
As a word processor, DeskTop Folio offers text cut, copy and paste, colour underline and delete as well as allowing you to specify fontsize and spacing from a range of four fonts supplied with the package as well as using your own or pre-set stationery designs.

As a desktop publisher, words can be written into frames with control over formats and styles. Pictures can be dropped into frames and re-proportioned with full facilities provided for moving, copying, adjusting, overlapping and hiding frames.

Accuracy is achieved by a grid system and dimensioning. There are limited drawing facilities for presentation purposes, too.

As an interactive publisher Desktop Folio can be used to produce documents with added buttons which when *pressed* lead to a variety of responses – turning pages, giving instructions or asking questions as well as changing styles and formats.

This feature – along with most Hypermedia systems – provides a wide range of opportunities for interactive and independent learning.



Notepaper, Film, Poster and Reporter styles

It certainly takes the concept of desktop publishing a stage further in terms of a learning medium rather than being solely for presentation purposes.

The whole package is extremely well packaged, looking rather like an up-market containing three manuals, a set of A5 card tutorial sheets and five discs in a box. There's an excellent demonstration guiding you around the facilities on offer.

The Simple Screen Folio startup disc and its associated work disc allow you to retain the elements of working with Folio but goes much further with the ability to add pictures. You can convert existing BBC or Master Folio files to work with either of these programs.

The DeskTop Folio startup and work discs move you into the world of DTP proper. Included in this is interactive publishing, described by ESM as "a direct writing environment for a wide range of independent learning and decision making activities".

In simpler terms it can be seen as a hybrid of Hypermedia with elements of Magpie and Genesis. Yet it is fully integrated into DTP rather than being a separate activity. If you thought desktop publishing was exciting wait until you've begun to explore interactive publishing.

The startup disc also contains an excellent three part interactive tutorial which is an excellent demonstration of what interactive publishing is all about.

Finally, a Library disc contains clip art directories with such titles as Arrows, Backgrounds, Bubbles, Clips, Flashes, Fun, Grids, Hands, Images, Music, Scenes 1 & 2, Signs, Sport, Transport and World.

They contain a wide variety of !Draw, Sprite and text files, and manuals also give a number of sources of clip art and fonts. DeskTop Folio, though obviously marketed to school use, has a powerful series of tools for any pupil using a computer at home.

The comprehensive manuals include a ReadMeFirst booklet giving an excellent overview as well as a manual called Practical Ideas. This looks at the National Curriculum, Curriculum Ideas, Administrative Uses, Designing Pages, Resources and a FactFile. It's a brilliant little book packed with ideas as well as giving details of sources of other programs to use alongside DeskTop Folio.

A reference guide gives details of the concepts behind the package, plus how to operate the software, the main tools, as well as giving ideas on designing stationery. There is a very useful series of worked examples too.

The final piece of documentation is a series of A5 cards which gives details of menus, layouts of stationery, examples of clip art, 12 activity cards looking at the intricacies of the package, a list of short cuts and a dictionary of terms.

This really is a step in the right direction in terms of manual design and support. Laminating these cards for classroom use works very well indeed.

When you run Simple Screen Folio (SSF) disc for the first time you type in the registration details for the stand-alone version and then set up your work disc, which can be backed up from the supplied version. You follow the same procedure for Desktop Folio.

There isn't a lot of room on the work disc, as a variety of resources are included to help you get started. You could tailor this to include the resources you really need. Installation is very straightforward.

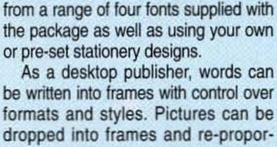
The screen is very similar to the original Folio one with the addition of a small representation of a poster in the bottom left hand corner – the default stationery design – and a small controls menu bottom right which toggles between the main menu and the controls menu.

A selection of alternative writing formats, notebook, letter, film review and blank page are supplied as ready-made formats. They also have their own text formats such as the poster which centres everything you type.

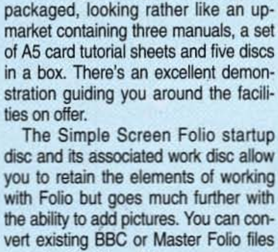
The Control Menu allows you to change the format of your writing by selecting one of the five stationery designs. The stationery designs may contain multiple frames which are accessed by clicking and which then appear in a full screen viewer to allow you to start typing.

The page icon in the bottom left hand corner of the screen shows the layout of the whole page you are working on. If you overfill the page the overflow facility comes into action, allowing you to work on a succession of pages and to control movement backwards and forwards to edit the work.

As well as the stationery options you can control the format of text by paragraph through to single letters. Using the scratchpad folder lets you add pictures and enlarge or reduce them.



Folio working screen



Tutorial A.

This Tutorial aims to give you a quick overview of the facilities of Desktop Folio.

This is section A and is a basic introduction to the Program. First a few conventions.

Takes you to the menu

Turns back a page

Turns forward a page try it now...

There's an excellent tutorial

to warm mice

Pictures need to be in the scratchpad folder before you start work though. Saving files follows the usual form using the dialogue box.

Moving on to Desktop Folio, you'll find it intuitive to use and once the work disc is in place you can get to work straight away. The default document is the letter and envelope from the stationery store which also includes layouts for film reviews and so on.

You can load more than one document on to the desktop at a time and the icon bar is also available, unlike Simple Screen Folio which takes up the whole screen. Both stationery and resource files can be loaded and saved in directories.

The more adventurous can personalise the configuration of the program, from changing directory names to determining which documents you want loaded on startup. You can also choose the standard or BBC keyboard and determine the scale of objects so that there is a direct correlation between the printed image and the image as seen on screen.

Desktop Folios is controlled by a series of Toolbox icons to the left of the working areawhich give access to Links, Stationery, Resources, Documents, Write, Draw and Design.

The Link Icon determines whether the toolbox is attached to the side of the document window, placed independently or turned off completely. Nicely implemented.

The Stationery, Resources and Documents Folders, as you would expect, allows you to access these folders. Each piece of work has its own directory which contains the document and design details as well as the text files used.

By keeping track of where all the resources are for a particular document it saves re-saving them – especially useful if you want to show a document in full on a different computer.

Write allows you to put text into blue frames and edit text. When you click on a frame an independent text window appears to allow you to type in and control text from whole paragraphs down to individual letters in terms of colour, underlining, copying, deleting and cut and paste.

Cut, Paste and Copy are used in conjunction with the Clipboard. Text can also be dropped in from directories as long as it has been saved as an Edit file.This a features any true Risc OS program should have as it aids the integrated nature of working on computers.

You can illustrate your work with pictures dropped between paragraphs or into individual boxes/frames.They can then be rescaled, saved and deleted using the picture menu.

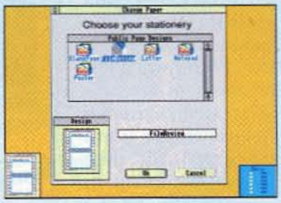
As with Simple Screen Folio, each piece of stationery has its own style and format for individual frames. You can use the existing styles, edit them or create your own styles though you wouldn't want many ,otherwise your document would look unnecessarily messy.

If you alter one frame all others which use the same style will follow suit. Their style is controlled by the Frame Style Menu.

Moving on to Draw, you'll find that you are able to use simple backgrounds consisting of lines, boxes and ovals in any of 16 colours and in solid and outline versions.

Draw also has its own control menu to control the way the backgrounds appear. They can be resized and their positions changed, copied ,coloured, filled, overlapped and deleted.

Design allows you to produce a wide variety of documents in a range of styles and formats as well as producing interactive stationery. Designing documents is perhaps the key to the successful operation of Desktop Folio.


Choose Paper
Choose your stationery
Public Page Designs
Letter
Poster
Design
FileReview
Ok
Cancel

Changing paper

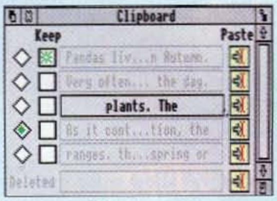
Frames of any size and proportion can be drawn, overlapped, locked, copied, moved and deleted. The Grid option controls the accuracy to which frames are placed.

Frames can contain text or pictures and can be copied, adjusted, moved, overlapped or deleted. Their positions and dimensions can also be controlled accurately by using the Frame Dimensions dialogue box.

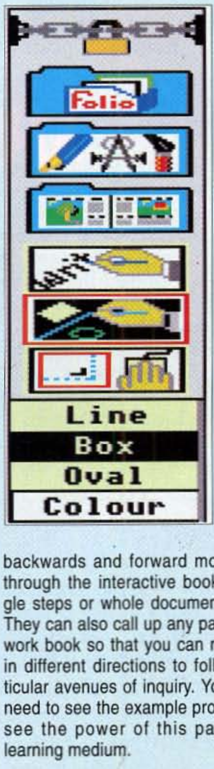
Anyone familiar with Impression will have come across frame locking. This protects the contents and makes them appear to be part of the background stationery and won't allow you to edit it in anyway without unlocking the frames first.

The interactive workbook which is provided as a worked example in the Reference Guide shows the most powerful concept behind Desktop Folio – interactivity.

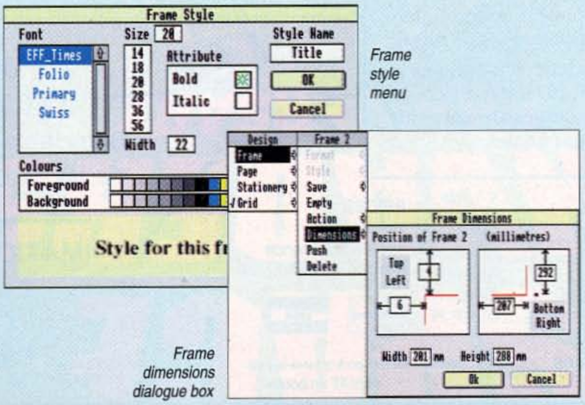
Used as an interactive learning medium exploration can be as open or as guided as the designer of the interactive workbook chooses. A series of buttons controls the sequence of information presented, which can be linear or tree structured, for example. Buttons control backwards and forward movement through the interactive book in single steps or whole document steps. They can also call up any part of the work book so that you can move off in different directions to follow particular avenues of inquiry. You really need to see the example provided to see the power of this particular learning medium.


Clipboard
Keep
Paste
Pandas liv...n Autumn.
Very often... the day.
plants. The
As it cont...tion, the
ranges. th...spring or
Deleted

The handy clipboard


Folio
Line
Box
Oval
Colour

The toolbox


Frame Style
Font
Size 20
Style Name
EFF_Times
Folio
Primary
Swiss
14
18
20
28
36
56
Attribute
Bold
Italic
Title
OK
Cancel
Width 22
Colours
Foreground
Background
Style for this fr
Design
Frame
Page
Stationery
√Grid
Frame 2
Format
Style
Save
Empty
Action
Dimensions
Push
Delete
Frame Dimensions
Position of Frame 2 (millimetres)
Top
Left
6
6
292
207
Bottom
Right
Width 201 mm
Height 288 mm
Ok
Cancel

Frame style menu

Frame dimensions dialogue box

Summing up

I can wholeheartedly recommend that primary, junior, middle, high and even some secondary schools buy this package if they want to move forward from word processing to desktop publishing and interactive learning with all the inherent educational benefits that such a move will have.

Poster

An object-based DTP package which allows you to do far more than create posters. In fact there isn't much in the way of DTP design and layout that can't be done with Poster. It's almost an art package. The application is fully RISC OS compliant so can 'talk' to Edit, Draw and any other RISC OS program. Poster comes with its own set of unusual outline fonts but will allow you to use any RISC OS outline fonts. It also has a huge collection of interesting borders and clip art. Two features place Poster in a different league from other packages. Firstly, you can do wonderful things with text. It can be made to flow along any path or it can be moulded into virtually any shape (as can outline Draw files). Secondly, the size of your document is not dependent upon the limitations of your printer. Poster will allow a document of any size to be created (although 100 metres square is not very practical). It then prints the document in sections which can be cut and assembled using the trim marks. Poster documents may be used in other DTP packages.

ACORN COMPUTING 1990
ART/DESIGN AWARD WINNER

Snippet

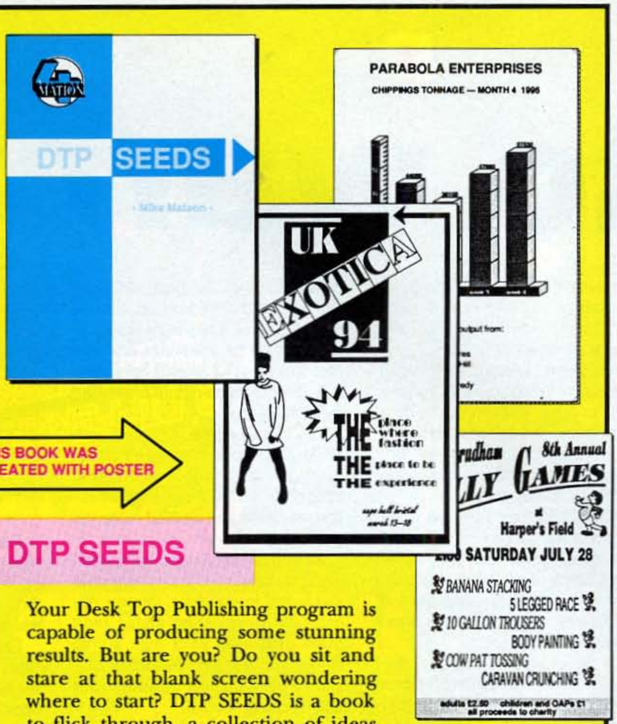
A utility which will make you wonder how you ever managed without it. Snippet will allow you to print or save any part of any screen. It will even cope with most programs running under the 65Host BBC Emulator. But Snippet will allow you to do lots more. Sprites may be converted from one mode to another and even 8 bit BBC screens may be easily converted into Archimedes sprites. A vast array of tools allows you to trim sprites, add borders, change colours, use outline fonts to add text, edit pixels, rotate sections and combine any number of sprites to make a single sprite. A carousel allows sprites to be displayed.

ALSO...

JIGSAW — allows sprites of any size to be converted into jigsaws with real jisaw-shaped pieces. It comes complete with a set of pictures including some by the well–known artist Rodney Matthews.

JIGLET — the version for younger users. It has fewer pieces and a more appropriate set of pictures.

CRAFTSHOP 1 and CRAFTSHOP 2 — programs allowing those with limited artistic ability to create some stunning results. Both packages are currently in use in thousands of schools and homes.



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Steve Turnbull explores a new database package with a big future

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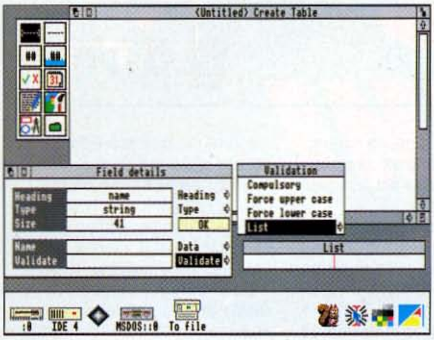
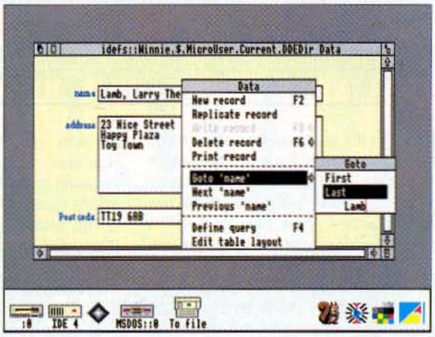
Price: £129 single user, £516 site licence
Supplier: Digital Services Ltd.,.9 Wayte Street, Cosham, Portsmouth, Hants PO6 3BS.
Tel: 0705 324934


(Untitled) Create Table

Field details

Heading: name
Type: string
Size: 41
Name:
Validate:

Putting in the first field


idefs::Winnie.$.MicroUser.Current.DDEDir Data

name: Lamb, Larry The
address: 23 Nice Street
Happy Plaza
Toy Town
Post code: TT19 6AB

Simple searching

OF the three program types that every club and business should have – wordprocessors, spreadsheets and databases – it is the last one that provides the longest term benefits and the potentially worst problems.

You can change your wordprocessor and spreadsheet fairly easily but a database has to last a long time because once your data is in it changing to another can be a mammoth task.

So it's essential to chose the right one first time or you could be lumbered with a dinosaur that holds you back rather than improving your productivity.

In the home the problem is not so severe, but you still need ease of use, after all why fight with a piece of software when all you might otherwise need is an address or birthday book?

The Squirrel database has been very carefully designed to make the most of the multi-tasking windows environment, allowing databases to be created very easily but with the power to support multiple files.

The package consists of a slip-box with a 150 page manual and a single disc. This is the registration disc and before you can use Squirrel you *must* register, however this is not too strenuous a task:

Clicking the drive icon auto-runs the installation procedure, of which the first step is formatting a disc, carried out automatically. Then the contents of the Squirrel disc are copied to the new one. Then you are asked for an owner's name. The final step involves ringing Digital Services for a special *key code* based on what you have input and a *lock code*.

Alternatively you can send a fax or write for the key code, giving the relevant details, but you won't be able to use Squirrel until you get it. You then have to restart the installation procedure and ensure you enter the owner's name *exactly* as you did before.

When the program is loaded the Info dialogue box is unobtrusively displayed showing the owner's name. This only happens once and a mouse click anywhere on screen removes it. I found the whole process quite painless and the start-up message acceptable.

The system also has the advantage that Digital has a complete record of all installations, but they don't request your name or address, so it's not just a ploy to create a mailing list.

The manual is very clear in most respects with lots of illustrations, short paragraphs and loads of white space which takes all the stress out of reading it.

After the installation section there's a short overview of the system followed by a tutorial which introduces most of the basic concepts involved in creating and using a database of music recordings.

The only point I was not entirely happy about was that no example databases were included – these are useful for practical illustration of more complex concepts and they were certainly missed.

Putting together a database from scratch is amazingly simple. From the iconbar menu you select the Create Table option which presents you with a blank window with a toolbox on the left. You start each field by dragging a box, roughly the shape you want, into the window.

When you release the mouse button a dialogue box appears and here you enter the name of the field, its type and size, click *okay* and the name and field box appear in the window.

The field types available are: Fixed length text, variable length text, a special multi-line variable text, fixed and floating point numbers, dates, *Boolean* (yes/no), sprite, drawfile or *other file* – this allows any type of file to be held in the database even if Squirrel doesn't know what to do with it.

Each field type is extended further by controlling the format, for numbers and dates, and enforcing a validation

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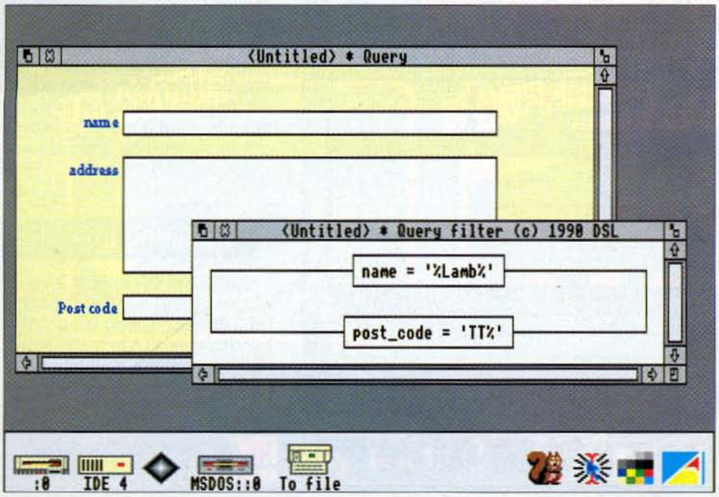

(Untitled) * Query

name
address
Post code

(Untitled) * Query filter (c) 1990 DSL

name = '%Lamb%'
post_code = 'TT%'

More complex search criteria

:0
IDE 4
MSDOS::0
To file

procedure. For example you can insist that data is always entered in a field and control upper and lower case for strings.

In some cases you can provide a list of valid values. For instance perhaps only a fixed number of dates is applicable, or a certain range of numbers, or any number over 326.

You can control what typeface is used and its size, each field heading and data area can be assigned separately, or you select some or all fields and headings to perform the changes on all of them. Colours are also independently adjustable, allowing visual data cues for data entry.

Normally the data entry sequence is in the same order that you create the fields, but if you realise you've made a mistake – perhaps not including enough address lines – you can add one and then adjust the entry order so that it follows sequentially.

Having decided your layout is finished you then select the save option, enter an appropriate file name and drag the boxed squirrel icon to a Filer window. At this point you may get confused, because what's created isn't a single file with a squirrel icon, but a directory.

Inside it are four separate files but normally you won't see them because Squirrel intercepts any attempts to open a directory and checks to see whether it's a database directory, and if it is it gets loaded instead. There are instructions in the appendix for turning it into an application-type directory like Impression documents. It explains how to provide a little icon of the file, but doesn't show how to use the boxed squirrel icon – which seems the obvious choice.

After saving you are put straight into data entry mode and can start typing. Pressing f3 will save the record into the database. Any fields that have been specified as compulsory must have an entry before the record can be saved.

A database is only as good as its access and output facilities. Unlike other databases, Squirrel doesn't shout about being relational – which is definitely the in-thing – but it is.

Let's say you have a name, address and birthday file. With the cursor in the Surname field you can use the Page Up/Page Down keys to move through the database and see everyone's name. There's nothing special about that.

But if you click on the birthday field you can use the same keys but this time move through the database via the date order of birthdays or select the postcode and use that as the index. In a relational database all the fields are indexed – or at least they appear to be.

You can also search for specific entries of a particular field using options on the pop-up menu. However more complex searches involving multiple fields are accessed via the Query window.

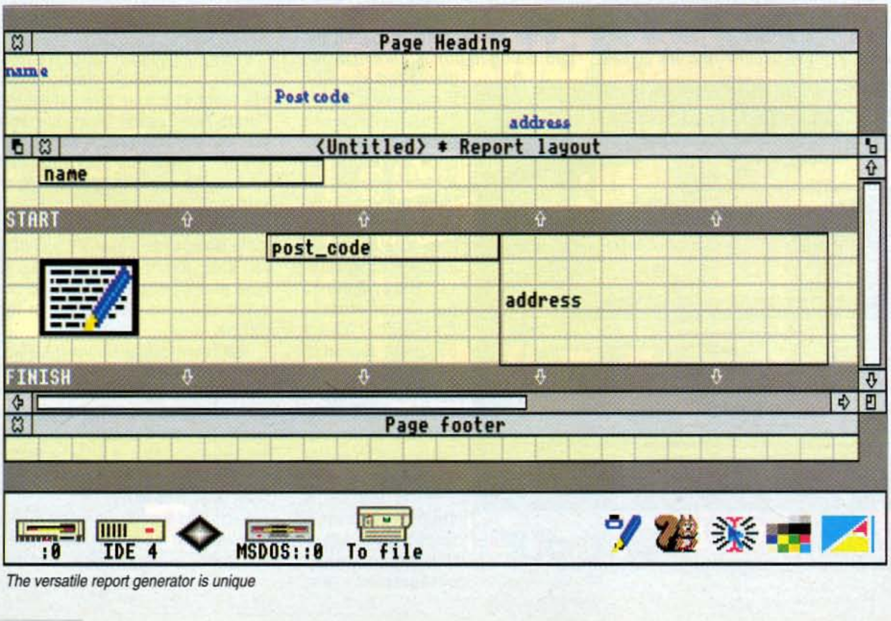
This allows you to construct *filters* in a graphical way and a query will present you with a subset of the database which you can then look through as normal.

Queries can be loaded and saved either in the internal query format, as a draw file of the filter diagram, or as a standard query language (SQL) text file. Again, creating and modifying is simplicity itself and completely under your control.

A very important concept is the *View*, a method of presenting data with a different format to the original. It need not have the full set of fields, so secret information can remain hidden from a particular user. The files are displayed are controlled by a query so a view must have one defined with it.

In addition a special type of calculation field can be added at this point. Multiple file access occurs here because fields from different databases can be dragged over and included on the same view – up to 26 can be joined in this way.

In a networked system a high degree of security is available because the database manager can place the main database beyond the reach of the less priviledged users, but the views they are permitted to use can be available on the hard disc.



The versatile report generator is unique

Once you've decided on your standard queries and views you'll need some reporting facilities.

Squirrel has emerged with what seems to be a unique system, once again dependent on the particular query in use – in fact the report format is also saved with the query. This is quite reasonable as you would probably want the same format in each case. However, once it's loaded you can alter it, so there's no real problem.

The whole report design system is very graphical in nature and difficult to describe in text. Suffice to say it is simple and intuitive.

A clever addition is the ability to drag text, draw and sprite files into the report design window and their content is included on the printout. These can also be included as actual field contents and would be printed if included in the report as well.

The upshot is that you can have pictures and drawings in the report, and if you have a database that's a library of clip art, you can get an illustration of each.

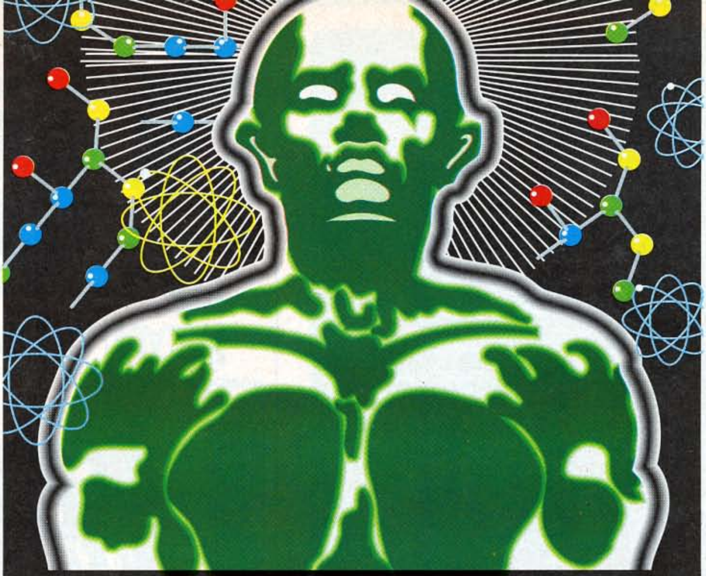
I've referred to Squirrel as if it's just one program – but it isn't. In fact there's Squirrel and the SquirrelEngine, which performs the actual database handling. This method means that different types of front end can be added to the engine in order to manipulate database files in different ways.

Digital Services will also be upgrading Squirrel to support the Impulse system so that other Impulse software can have hot links into databases and it will be possible to provide mailmerging and more complex report facilities.

Summing up

Squirrel has come out of the blue to brighten up the desolate database scene on the Archimedes. It has leap-frogged all the database development of the past 10 years and emerges as the pre-eminent data storage system for the Arc – at present.

And just in case you're wondering why it has such a silly name, it's derived from SQuirreL.



The Beeb Body Building Course

Transistor curve tracer

Mike Cook sets off on Part 4 of his I^2C bus adventure

WE looked last month at the various modes we could use to operate our I^2C bus interface board – first described in the June issue. This time let's consider an application that exploits some of board's unique flexibility.

We are going to construct a system which will allow you to test, match and examine a transistor's characteristic curve.

Of course you can get dedicated curve tracers – I have one in my lab. It cost several thousand pounds and has to be wheeled around on a trolley.

To be fair such an outlay brings a little more flexibility, nevertheless our project will produce very similar curves.

The transistor is a three terminal device that can be operated as an amplifier in three modes – common base, common emitter and common collector, the last perhaps being the configuration most often found in circuits.

The common emitter – or *emitter follower* – tends to be used only as a buffer and the common base is used only at very high frequencies.

The common emitter gets its name from the fact that the emitter is grounded and so is common to both the input and output signals – see Figure I.

Transistors are current devices, that is they work by virtue of the current flowing through them. Of course, in order to make that current flow we have to apply a voltage but the relationship between the current and voltage is not a linear one.

With a resistor, the more voltage you apply across it the greater the current flow through it. If you were to plot a graph of voltage against current you would get a straight line, which is why a resistor is known as a linear component.

Going back to Figure I, we can plot the graph of the voltage applied to the transistor against the current flowing down it. This is known as collector current versus collector voltage, or Ci against Vcc.

Now if we do this we will find that no matter how much voltage we apply to the collector no current will flow. However, if we repeat the experiment, only this time have a small amount of current flowing through the base of the transistor, we will get a much larger current flowing from the collector to the emitter.

As we increase the collector voltage the current will rapidly rise until we get to about 0.2 volts, at which point it will suddenly flatten out and no matter how much more we increase the voltage, no more current will flow.

What is happening is that the tiny current flowing through the base allows a much larger current to flow through the collector. If we divide the collector current by the base current we get the current *gain* of the transistor. It is this effect that allows us to use transistors as amplifiers.

It is normal to plot several curves of collector voltage against current, each one for a different value of base current. This is known as a family of curves. The spacing of these curves tells us about the linearity of the transistor. In this case this means how stable the transistor's gain is for different driving levels. Most transistors are not very linear at small currents but improve greatly at larger ones.

Well that's the theory, now let's see how we can get our Body Build I^2C interface board to plot these curves.

First of all we need a variable source of voltage to apply to the transistor, and the buffered analogue output will fit the bill. Numbers between 0 and 255 sent to the board will give us between 0 and 5 volts.

Because it is buffered with a transistor on the board, we will only be able to get up to about 4.5 volts, however, this is quite sufficient.

Now we need to measure the voltage on the transistor's collector. This will not be the same as the output voltage, because when the transistor is conducting current it acts like a potential divider with the collector resistor. But one of the board's single-ended analogue inputs will do.

Finally we need to measure the collector current, this can be done by measuring the voltage across the collector resistor. Then by applying Ohm's law to this measurement we can calculate the current. Note that this voltage is measured across the resistor and so is not referenced to ground.

We can only measure this using a differential input. Fortunately, as we saw last month, the board is capable of being configured to give both a differential and single ended input.

So that's sorted out the measurement, but we are still left with the problem of the base current. This needs to be kept fixed while we measure one curve and then changed for the next. What we really need is another analogue output, and this would require another board.

However, as we do not need too many values of base current we can make a simple digital to analogue converter on three bits of the digital output.

This is done by using weighted resistors of 10K, 20K and 39K – all right it would be better with 40K, but they don't make that value and it's close enough.

The outputs need pull-up resistors and it is all passed through a 470K resistor to limit the base current to a suitably small value. The whole arrangement is shown in Figure I.

So now we need the software to drive it which is provided in the listing. The program is written in a very flexible way and will allow you to change various points. For example, the position of the whole graph is determined in line 70.

The Archimedes allows different fonts to be used. Most are on disc but some are built into the operating system. I used the Greek font, line 40, because it allowed me to have a *squared* and a *mu* for the graph labelling.

Basically the program applies a series of voltage steps to the transistor's base, lines 120 to 150, each step

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giving a different colour. Then a voltage ramp is applied and the voltage and current is measured (lines 160 to 190). The readings are converted to screen co-ordinates, stored in an array and plotted on the screen. The array values are used to remove the series of points from the last complete scan.

The procedure PROC_YAXIS called in line 300 must be passed a number, this is the value, in KΩ, of the collector resistor. The procedure uses this to plot exact current values on the Y axis. It will also make a semi-intelligent guess at scaling for various current ranges.

You will notice that all the curves do not reach the same voltage when the program is run . This is because, depending upon the current flowing, some of the applied voltage is dropped across the resistor.

If you were to take the end points of each curve and join them up and continue to draw the line back to the zero volts line, it would intercept the current at the value that would flow if the maximum voltage were to be applied to the resistor.

This limits the maximum amount of current that could flow through the transistor. When this is reached we say the transistor is saturated.

Another thing to note is what happens when you change the value of the 470K base resistor. If you give it a lower value more base current will flow, increasing the collector current, which results in the curves being further apart.

However, if too much collector current flows the maximum differential input of the board will be reached and the larger curves will appear to flatten out at the top of the graph. This is a limitation of the measuring circuit, and not the transistor.

The other thing you can alter is the value of collector resistor. If you do this, remember to alter line 300. You will see that, while the overall graph seems to have changed in scale, the actual values plotted are the same.

This shows that it really is the transistor that is controlling the current flow and not the resistor. However, it will give you the opportunity to change the base current values and investigate the transistor's characteristic over a different range.

By plotting the curves of several transistors you can find ones that have closely matched gains – useful when building a hi-fi class B amplifier. This is because matched gains minimise signal distortion.

Well there you have it, quite a good demonstration of computerised data gathering. See you next month for more of the same.

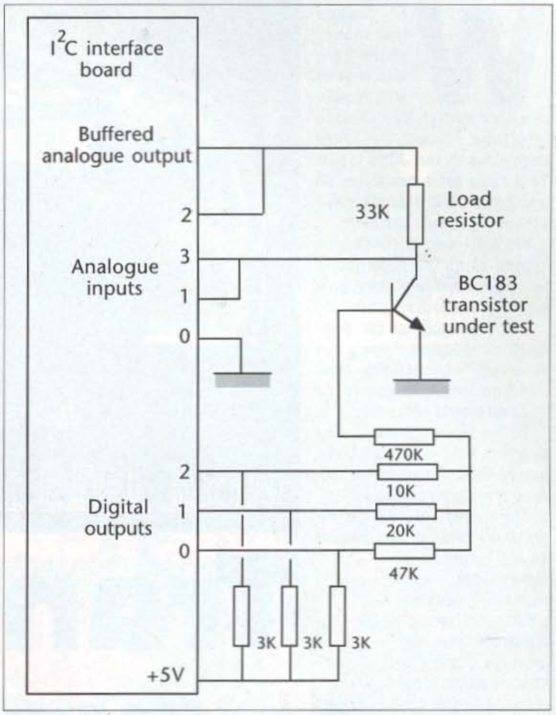


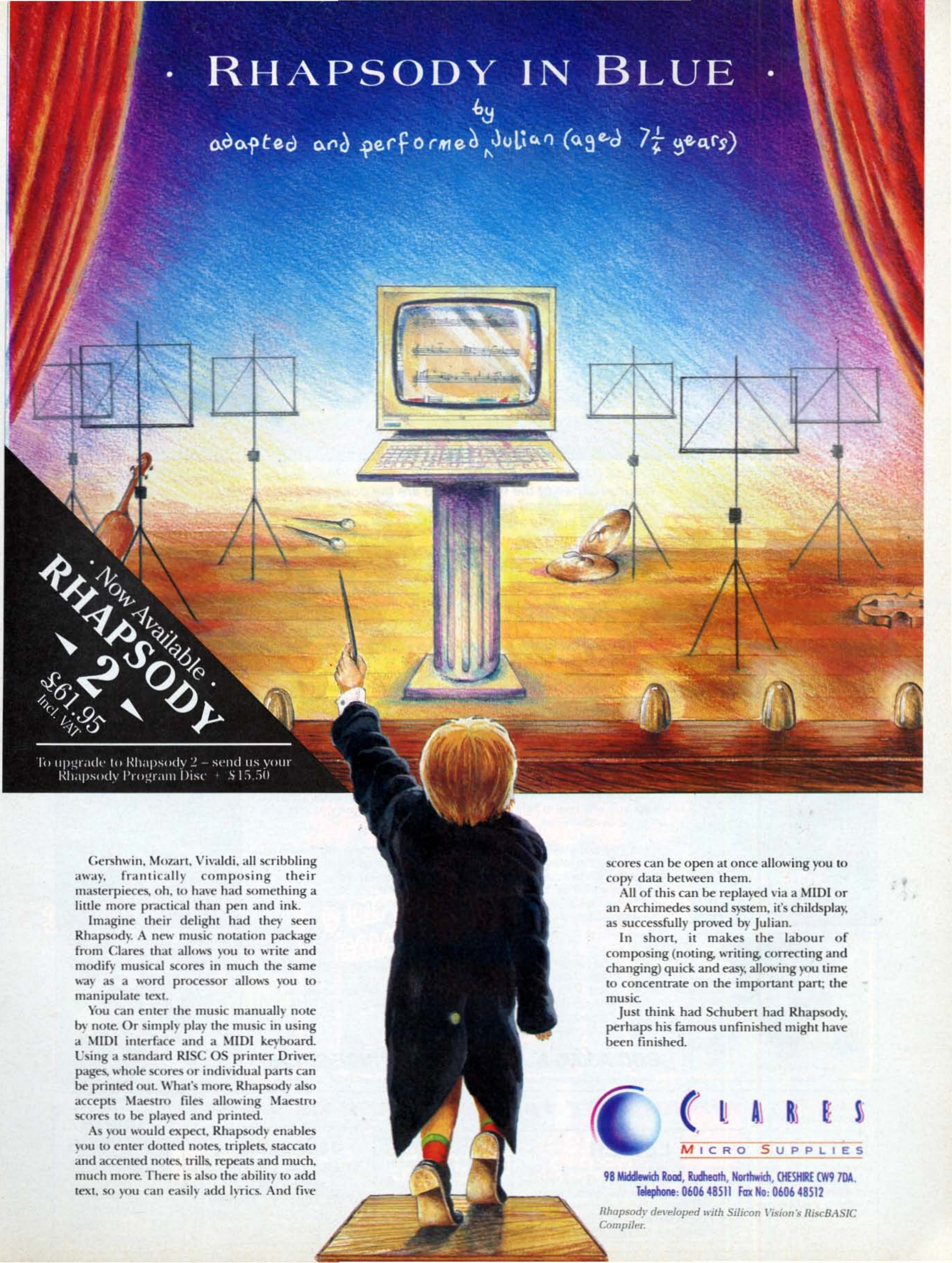
Figure I: The I^2C analyser

```
   10 REM > I2CTracer (Arc only)
   20 MODE 12
   30 PRINTTAB(18,1)"I"CHR$&B2"C Interfa
ce Curve plotter  By Mike Cook"
   40 *Alphabet GREEK
   50 DIM V%(255,8),I%(255,8),PBK% 3,PBR
% 3,PBD% 3
   60 DIM IX$(5)
   70 X1%=192:Y1%=200
   80 ?PBK%=&64
   90 SYS "IIC_Control",&90,PBK%,2
  100 PROC_AXIS
  110 REPEAT
  120 FOR B%=1 TO 7
  130 ?PBD%=B%
  140 GCOL 0,B%
  150 SYS "IIC_Control",&70,PBD%,1
  160 FOR A%=0 TO 255
  170 PBK%?1=A%
  180 SYS "IIC_Control",&90,PBK%,2
  190 SYS "IIC_Control",&91,PBR%,5
  200 PLOT 71,V%(A%,B%),I%(A%,B%)
  210 V%(A%,B%)=(PBR%?1)*4+X1%
  220 I%(A%,B%)=(PBR%?3)*4+Y1%+4
  230 PLOT 69,V%(A%,B%),I%(A%,B%)
  240 NEXT:NEXT
  250 UNTIL FALSE
  260 END
  270
  280 DEF PROC_AXIS
  290 PROC_XAXIS
  300 PROC_YAXIS(33)
  310 ENDPROC
  320
  330 DEF PROC_XAXIS
  340 VDU 5
  350 LINE X1%-34,Y1%,1084+X1%,Y1%
  360 FOR V=1 TO 5
  370 MOVE X1%+(V*(1024/5))-(512/5),Y1%
  380 PLOT 1,0,-12
  390 MOVE X1%+(V*(1024/5)),Y1%
  400 PLOT 1,0,-20
  410 PLOT 0,-8,-12
  420 PRINT;V
  430 NEXT
  440 MOVE X1%+460,Y1%-78
  450 PRINT"VOLTAGE"
  460 Y1%+=4
  470 VDU 4
  480 ENDPROC
  490
  500 DEF PROC_YAXIS(R)
  510 LOCAL I%,T,SC
  520 GCOL 0,0
  530 RECTANGLE FILL X1%-170,Y1%+4,166,5
50
  540 GCOL 0,7
  550 SC=0
  560 IF R>10 THEN R=R/1000:SC=1
  570 FOR I%=1 TO 5
  580 T=INT(10*I%*((2.5/R)/5))/10
  590 IX$(I%)=LEFT$(STR$(T),4)
  600 IF LEN(IX$(I%))=1 THEN IX$(I%)=IX$
(I%)+".00"
  610 IF LEN(IX$(I%))=2 THEN IX$(I%)=IX$
(I%)+".0"
  620 IF LEN(IX$(I%))=3 THEN IX$(I%)=IX$
(I%)+"0"
  630 NEXT
  640 VDU 5
  650 MOVE X1%-160,Y1%+408
  660 VDU 23,16,8,0,0,0,0,0,0,0
  670 PRINT;"Current "
  680 VDU 23,16,0,0,0,0,0,0,0,0
  690 MOVE X1%-170,Y1%+150
  700 IF SC=0 THEN PRINT;"mA" ELSE PRINT
;CHR$(&EC);CHR$(&C1)
  710 LINE X1%-2,Y1%-40,X1%-2,Y1%+572
  720 LINE X1%-4,Y1%-40,X1%-4,Y1%+572

  730 FOR I%=1 TO 5
  740 MOVE X1%-2,Y1%+(I%*(512/5))
  750 PLOT 1,-8,0
  760 PLOT 0,-80,12
  770 PRINT;IX$(I%)
  780 NEXT
  790 VDU 4
  800 ENDPROC
```

Get it right ✓

```
 10 =    0 0
 20 = 3C86 6
 30 = A82D D
 40 = AA15 1
 50 = 4A11 2
 60 = 6E1C 7
 70 =  566 A
 80 = 6081 C
 90 = 99E0 2
100 = 58B2 4
110 = BFBA C
120 = 3005 A
130 = 1F21 D
140 = CE4A 4
150 =  E1A 0
160 = 2BF8 E
170 = 6B1F B
180 = 99E0 7
190 = 4604 F
200 = 4CF1 6
210 = 6616 D
220 = 2AD8 8
230 = EE5F F
240 = 24BD 9
250 = 226C A
260 = FD2E 5
270 = D1AD 5
280 = 56C5 5
290 = DF76 D
300 = 3693 0
310 = ED0F 3
320 = D1AD 9
330 = 49B8 6
340 = EC10 B
350 = 8C2D A
360 = 9D79 7
370 = 72FB 1
380 = 20B6 0
390 = 33C8 9
400 = 55A7 E
410 =  FDE 5
420 = 373E 0
430 = 2C83 4
440 = 88F4 E
450 = A20A 8
460 = 66EB 1
470 = FC31 7
480 = ED0F 2
490 = D1AD 1
500 = A1BA F
510 = BFF7 1
520 = 71BA 5
530 = B877 C
540 =  15D 8
550 = EF80 0
560 = A8FC D
570 = C6E8 F
580 = AF7F 7
590 = 2AF0 2
600 = 12BC 2
610 = 76A3 9
620 = 9A5A C
630 = 2C83 9
640 = EC10 9
650 = 268B 5
660 = 4884 7
670 = 88AC E
680 = 6FC1 6
690 = DCC3 1
700 = 5C39 C
710 = 6EF4 1
720 = 488D D
730 = C6E8 7
740 = 5934 5
750 = DDDC 9
760 = 6C7B 2
770 = 1894 0
780 = 2C83 3
790 = FC31 B
800 = ED0F E
```


· RHAPSODY IN BLUE ·
adapted and performed by Julian (aged 7¼ years)
· Now Available ·
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2
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To upgrade to Rhapsody 2 – send us your Rhapsody Program Disc + £15.50

Gershwin, Mozart, Vivaldi, all scribbling away, frantically composing their masterpieces, oh, to have had something a little more practical than pen and ink.

Imagine their delight had they seen Rhapsody. A new music notation package from Clares that allows you to write and modify musical scores in much the same way as a word processor allows you to manipulate text.

You can enter the music manually note by note. Or simply play the music in using a MIDI interface and a MIDI keyboard. Using a standard RISC OS printer Driver, pages, whole scores or individual parts can be printed out. What's more, Rhapsody also accepts Maestro files allowing Maestro scores to be played and printed.

As you would expect, Rhapsody enables you to enter dotted notes, triplets, staccato and accented notes, trills, repeats and much, much more. There is also the ability to add text, so you can easily add lyrics. And five scores can be open at once allowing you to copy data between them.

All of this can be replayed via a MIDI or an Archimedes sound system, it's childsplay, as successfully proved by Julian.

In short, it makes the labour of composing (noting, writing, correcting and changing) quick and easy, allowing you time to concentrate on the important part; the music.

Just think had Schubert had Rhapsody, perhaps his famous unfinished might have been finished.

CLARES
MICRO SUPPLIES

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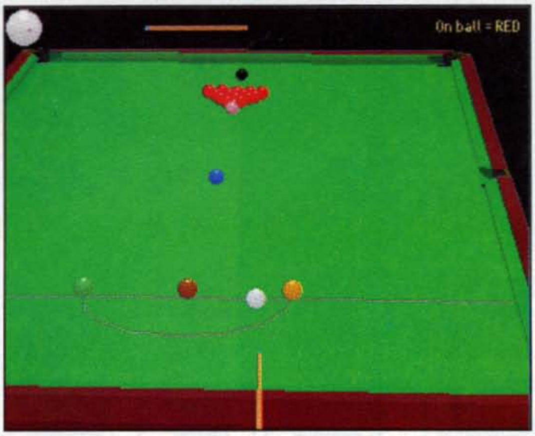
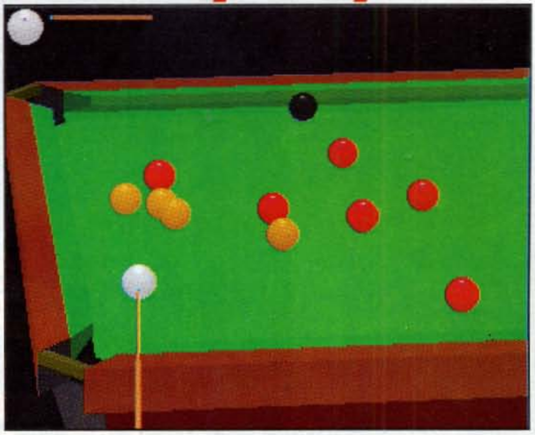
Telephone: 0606 48511 Fax No: 0606 48512

Rhapsody developed with Silicon Vision's RiscBASIC Compiler.

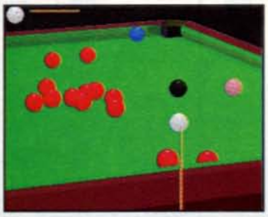
BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES

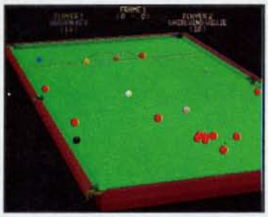
Break 147 & Superpool

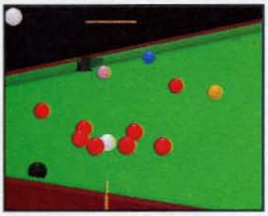


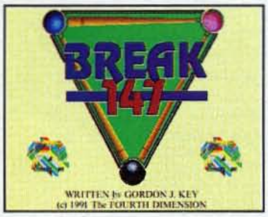


"Snooker & Pool Simulator Par Excellence"









'BREAK 147' and 'SUPERPOOL' are game simulations in the true sense of the word. Gone are the power meters and fixed screw and side settings of inferior simulations and in comes a cue driven by reality software.

As in the real thing your grip on the butt of the cue (represented by the mouse), the smoothness and power of your cue action and the way in which you follow through with a shot, are all deciding factors in whether a pot is successful and whether you will retain position for the next ball. The only thing that is missing is the smokey air and a pint of beer on the edge of the table, these you will have to provide for yourself!

In both games you can choose to play on a practice table where anything goes. You can position balls wherever you wish so that you can improve your potting and positional play. You can even undo unsuccessful shots so that you can try them again. When you make that incredibly fine clip into a pocket or miss by the merest fraction, you can watch an action replay of the shot from any angle so that you can either gloat or see where you made that tiny mistake that let you down.

When you feel that you are up to the task you can play a single match against a friend or against one of the sixteen computer players. Should you feel lazy you can just sit and watch whilst two computer players battle it out between themselves. Alternatively you can enter a tournament where you will have to fight your way through the preliminary rounds and on to the coveted Final.

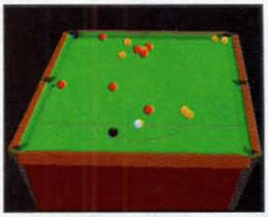
Whilst you are playing a match or in a tournament the game will be overseen by the referee. If in snooker you are 'on' a colour as in real life the referee will indicate the ball to you that he thinks you are going for and it is up to you to let him know if he is wrong. The referee will also call when a freeball is to be given, if there is a touching ball and your score after each successful shot.

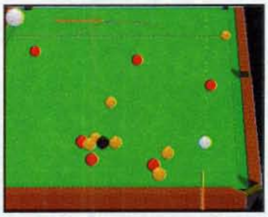
SPECIFICATIONS

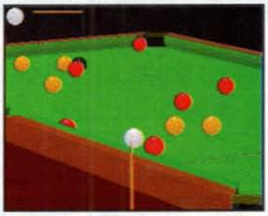
256 colour MODE 13 graphics optimized for maximum speed
225k of machine code
Over 147k of high quality sampled speech and sound effects
Ball plotting accuracy of +-0.05 of an inch on a 12 foot table
Cue butt controlled by the Mouse
Bridge hand controlled by Keyboard

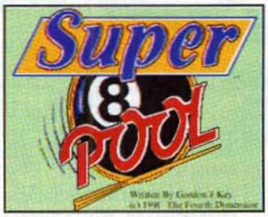
BBC A3000 & ARCHIMEDES PRICE £24.95

"Break 147 & Superpool" is compatible with the BBC A3000 and 310 & 400 Series









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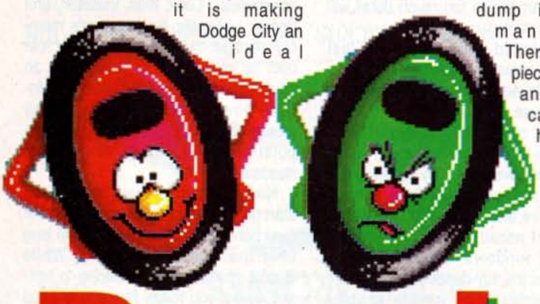
Software SCENE

89%

Boogie Buggy

...platform for a cute hero



LATEST in a long line of adventurous but weird creatures comes Boogie Buggy. We've had Repton and more recently Bug Hunter and I've no reason to believe that this is the only appearance of Boogie Buggy we'll be seeing.

Basically this bouncy little creation is a dodgem car, painted red with a very expressive face – especially as he frowns when you bump him into things.

There is a plot of sorts, and this one has the vrtue of not even attempting to be plausible. You exist in the peaceful world of Dodge City – Wyatt Erp never lived there.

The city is split into zones with the unlikely names of Sweet Meadow, Mudlark Bog and Tinkers Tree – all very idyllic until the arrival of Evil.

This thoroughly nasty chap has taken control and has set about corrupting ore from the mine in the centre of town. Previously said ore's power was used to create good. Now it is making Dodge City an ideal place for the creatures of darkness. Then he can indulge in his master plan to take over Bumper World.

Of course he has reckoned without our hero – Boogie Buggie, who travelling from zone to zone does battle until he can destroy the Evil in the mine itself.

Available on three discs, this game is very pretty to look at. The title and introductory screens are very well presented, the music is pleasant and optional while the standard of graphics is extremely high.

Should you choose a city location you have to collect the evil ore and dump it down manholes. There are 10 pieces of ore and you can see how you are doing by watching the *evilometer*.

Don't bump into anything – birds, ghosts or pieces of scenery – or your damage count will increase. Should it reach 100% – which it does with monotonous regularity – you lose a life.

If you plump for the Ore Conversion Plants in which to make your first forays you'll have to destroy it by reaching and reversing a polarity switch and then escape before the plant explodes.

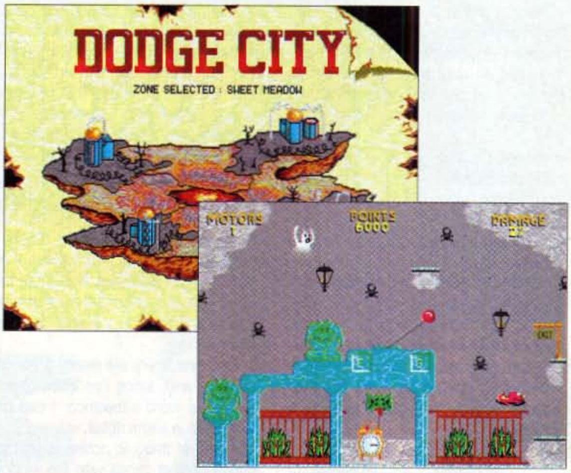
You're aided on your way by exits signs which you reach by moving forwards, backwards, left and right and up and down. By bouncing on obstacles you reach the height and position needed to move to the next screen – reminiscent of a host of games on the BBC.

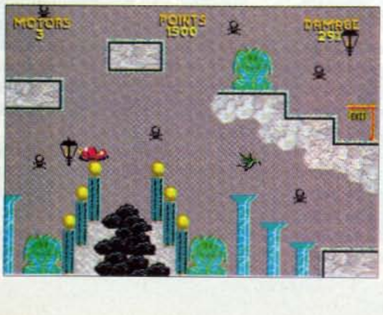
The graphical quality is excellent using an overscan screen mode so you play right to the edges. While the characterization of Boogie is brilliant it is hard to get control of the little bumper car. The bottom line is that Boogie Buggy takes some getting used to.

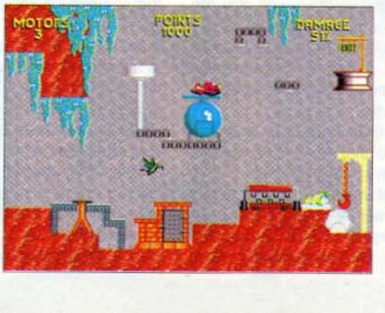
If you want a very nice looking game and enjoy the platform and level genre then definitely give it a whirl.

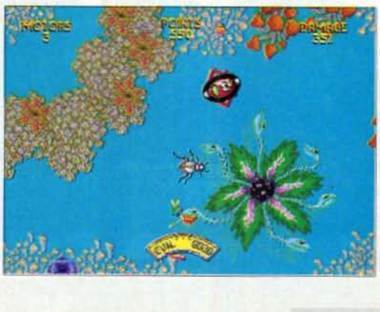
Jo Giles

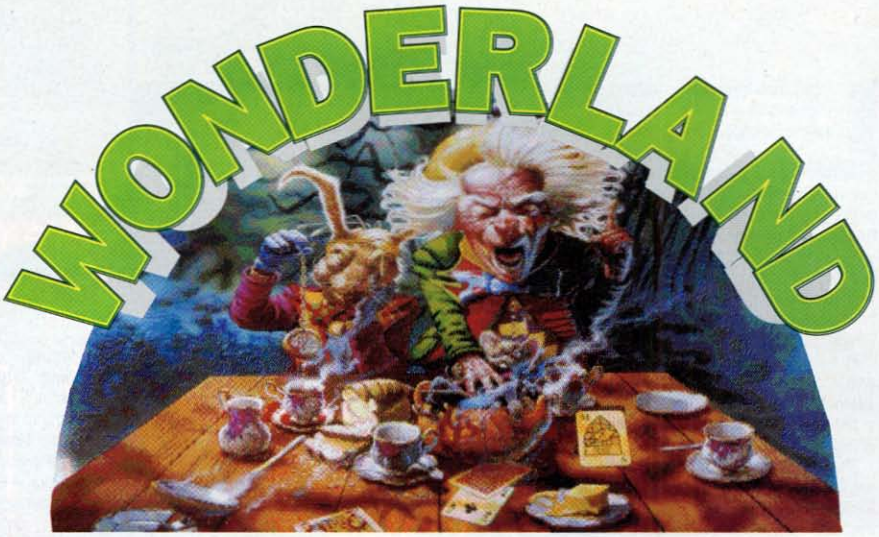
Price: £24.95
Supplier: Fourth Dimension, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 700661
Requirements: BBC A3000 and Archimedes range











WONDERLAND

...curiouser and curiouser

I HAVE been on the verge of indulging in two of the seven deadly sins over the past few weeks. I have been envious of the people with computers that can run **Wonderland** and have been so anxious to get my sticky little hands on the Archimedes version that it has almost amounted to lust. Now it's here, what can I tell you?

First, you get quite a lot for your money: There's a nicely designed package with a very flattering portrait of yours truly which, incidentally, is repeated inside on a poster *and* on the loading screen – so kind of those dear people at Magnetic Scrolls.

There is also a general map of the Wonderland area which I found a great help as I began my initial explorations.

Important information is contained on leaflets dealing with how to get started – including installing it on your hard disc if you have one – and a quick reference guide in English, French, Italian and German.

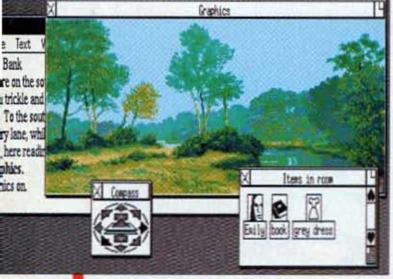
Finally there is a 66 page user guide and four discs containing the program.

Getting started is simplicity itself: If you have a machine with limited memory there are a few housekeeping tasks to undertake in order to ensure that you have avalable a screensize memory of 160k and another 700k free memory.

Most of this is taken care of by a little program called Config supplied with Wonderland and at the end of a playing session another program called Re-init saves you the bother of dealing with each relocatable module individually.

Control of the game is through a nice combination of mouse and keyboard input, though the lazy and those who get a kick from ignoring the keyboard can do everything via the mouse.

Minimalist purists can indulge themselves to their hearts content by playing a text only version via the keyboard. The text is elegant and literate and, once upon a time, would have received glowing reviews for that aspect alone. You can't ask for a greater range of options than that.



Now for a look at the playing environment in greater detail. Each location has its own illustration. I have raved with delight before at the quality of the graphics in Magnetic Scrolls adventures, and all I can say about these is that they surpass everything else that I have ever seen on the Archimedes.

A number of the illustrations contain animation, and two that particularly appealed to me were those showing the gentle fall down the rabbit's hole and the one depicting the caterpillar quietly smoking his hookah and pulling some very amusing faces as well. There are plenty of other animated illustrations, though.

There is nothing to stop you just playing with the text and graphics windows open – and indeed, there is something to be said for owners of limited memory machines doing just that. It will give you longer intervals between housekeeping chores in order to regain free memory.

However, there are plenty of goodies on offer and, since I've been given a generous word allowance, I can deal with them in some detail.

The first thing to notice is that you can do lots of things with the windows in Wonderland via the mouse. You can drag them around the screen, resize them, scroll the contents in some cases and, of course, close them or tuck them away behind the window in immediate use.

There are both pull-down and pop-up menus to deal with, and I'll start with those for the screen as a whole.

The most important for the majority of players will be the main menu bar which offers the on-line help facility. This facility, while tremendously useful, contains an inbuilt penalty: Consulting it too often and in too much detail will seriously damage your score.

You should only use it as a last resort to obtain the solution to a problem – instead, try to keep to the more cryptic clues.

Of the other facilities available on the main menu bar, the ones I found most useful were the *Tidy windows* and the *Refresh screen* options, though there were also those enabling you to save and reload a preferred arrangement of windows. These would be helpful for the tidy-minded.

The accessories window enables you to choose a variety of options including Graphics, Map, Compass, Inventory and Items in room. You would only need the Compass if you were playing entirely via the mouse – it indicates which exits are available.

I was happier on the whole entering directions via the keyboard, though I did find the Compass useful whenever I was revisiting locations – particularly if I had forgotten where the exits were.

Map is a very important accessory: It provides a visual representation of the places you have visited, giving your current location a pulsating border.

Another very important accessory is that showing the items in a room: You won't necessarily be able to take all those shown, but it may well help you to avoid overlooking something important to a later stage in the game. I am still kicking myself at the way I missed an item in the Duchess' House – but I may come back to that later.

Subsidiary menus for the playing window enable you to see, for example, what verbs are applicable in any given location – and you can then activate a chosen one by clicking on the mouse. There are also four primary commands – Look, Wait, Inventory and Score. Finally, the program's memory manager can play an important role both by inviting you to close down an application or even by shutting a window down temporarily – it's all designed to help prevent your computer from hanging up. Wonderland needs a lot of ram.

Now to the adventure proper: You start off – as you might expect – on the river bank with your sister. Not too long after that you encounter the White Rabbit scuttling past muttering to himself, and if you follow him you will find your way into the start of the game.

The beginning is a fairly self-contained puzzle: It centres upon finding a way out of the Long Hall. To do this, you will have to obtain a key and a disguise.

I am going to give some very definite clues here so that you should be able to find your way out without damaging your score too much.

A great deal of the action depends on being the right size in the right place, and you can get hold of a number of items throughout the game which enable you to vary your size when required.

Similarly, you won't get very far before you discover a number of locked doors – and the keys to these have to be discovered as well. If you get a firm hold of these two principles early on, you'll be equipped to read the clues planted in the text.

Now then, to get out of the Long Hall and proceed happily into the main part of the game you will need to get four keys and a disguise. When you get to the bottom of the rabbit hole go first to the Long Hall and have a careful look

Software SCENE

100%

Price: £35.75 (inc VAT)
Requirements: BBC A3000 or Archimedes (1Mb minimum)
Supplier: Magnetic Scrolls/Virgin Mastertronic, 16 Portland Road, London W11 4LA

around. You may need to do this more than once.

If you take what you find and examine things closely, you will get clues as to what is what, and you should be able to put what you have found to good use. Next retrace your steps, but don't ignore the pile of leaves.

Now go to the Music Room and open the piano: Careful examination should reveal two keys here – and your main problem is how to get hold of the key in G.

You are too big and heavy to climb on to the piano because its legs are too fragile, and so you need to become smaller and lighter. However, you will then need something to stand on before climbing on to the piano.

There is a way to stop the musical chairs from dancing around and, if you spend a little time in careful observation first, you should be able to work out what to do.

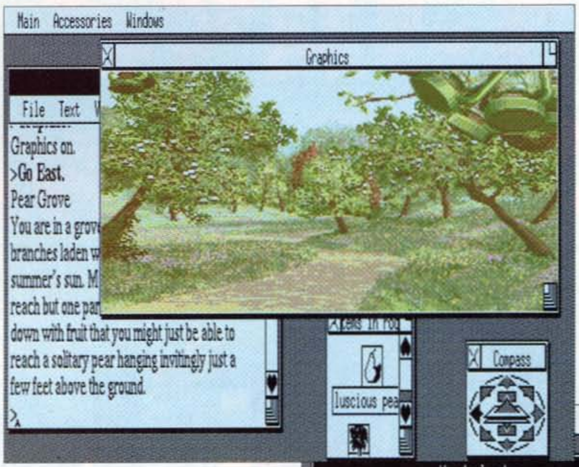
Your final task is to obtain and wear a disguise, so head towards the Long Hall, but make use of the key in C first. This should give you a potential disguise, a valuable container and a piece of equipment that can be adapted later for burglarious purposes.

You are now free to enter the Long Hall and await events. You will eventually come across two items discarded by the White Rabbit. Careful examination of one of them might suggest a way to use it. If you do so, and then don your disguise, you can happily await the turn of events.

I am going to give a couple more general clues, one of which is vital to a successful encounter with the caterpillar. If you fail here you won't be in a position to gain access to the some of the equipment you need for altering your size.

Mind you, this really is a very long chaining puzzle indeed and you are going to have to explore many locations before you will be in a position to put the caterpillar's advice into action. Make sure you follow it precisely.

The main point to notice is that, if you explore and examine the Palace precincts carefully you will get an indication of how to satisfy the caterpillar, but be warned, when I tried this part of the game in pure mouse mode I didn't get the clue that I came across when using the keyboard.



Graphics on.
>Go East.
Pear Grove
You are in a grov
branches laden w
summer's sun. M
reach but one par
down with fruit that you might just be able to reach a solitary pear hanging invitingly just a few feet above the ground.
>

luscious pea

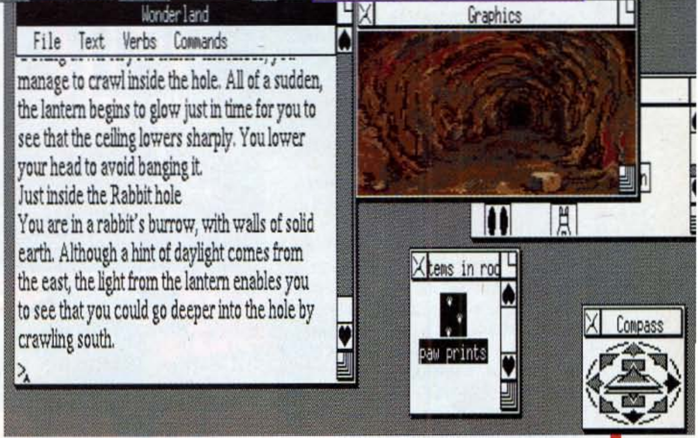
The other thing has to do with the Duchess' House. Readers of Alice's Adventures in Wonderland will recall that there is a rhyme that runs like this:

Speak sharply to your little boy,
And beat him when he sneezes.
He only does it to annoy,
Because he knows it teases.

Sneezing in that part of the adventure leads to disastrous consequences. It is essential, therefore, that you get hold of a means whereby sneezes can be prevented. Mind you, the whole house is a disaster area just waiting to entrap an unwary adventurer.

I found getting access to the palace itself took a fair old bit of research, and even when you do if you can't satisfy the White Rabbit you simply get slung out on your ear.

In passing, I really must urge you to read every room description most carefully. In one location I missed a doorway that I'd been through when just messing around, and so I lost access to an essential piece of equipment.



manage to crawl inside the hole. All of a sudden, the lantern begins to glow just in time for you to see that the ceiling lowers sharply. You lower your head to avoid banging it.
Just inside the Rabbit hole
You are in a rabbit's burrow, with walls of solid earth. Although a hint of daylight comes from the east, the light from the lantern enables you to see that you could go deeper into the hole by crawling south.
>

paw prints

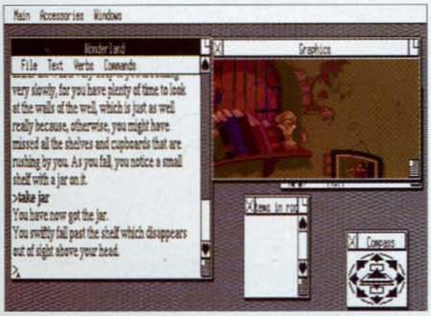
I had to suffer the humiliation of phoning a helpline – me, the Mad Hatter, needing help with my home environment, I ask you!

When inside the palace itself there are marvellous locations to explore and interesting items to acquire. I thought the Observatory was very well illustrated: Mind you, adventurers won't be able to put it to a lot of use unless they can make a spectacle of themselves.

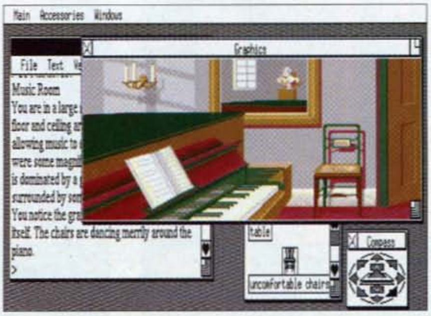
My final piece of advice will appeal to all animal lovers: Playing with that puppy can be most rewarding, and it involves cottoning on to an extremely clever play on words by the writers as well, if you are to get what you need.

Wonderland just has to be the mega-game of the year for Archimedes owners. Sell your granny if you need to raise the money somehow, but whatever you do, don't miss out on the most fabulous adventure I have yet encountered.

Mad Hatter

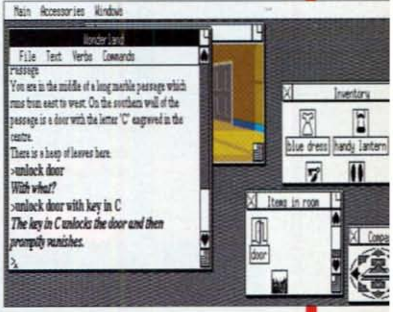


very slowly, for you have plenty of time to look at the walls of the well, which is just as well really because, otherwise, you might have missed all the shelves and cupboards that are rushing by you. As you fall, you notice a small shelf with a jar on it.
>take jar
You have now got the jar.
You swiftly fall past the shelf which disappears out of sight above your head.
>



Music Room
You are in a large
floor and ceiling ar
allowing music to
were some magni
is dominated by a
surrounded by som
You notice the gra
itself. The chairs are dancing merrily around the piano.
>

table
uncomfortable chairs



Passage
You are in the middle of a long marble passage which runs from east to west. On the southern wall of the passage is a door with the letter 'C' engraved in the centre.
There is a heap of leaves here.
>unlock door
With what?
>unlock door with key in C
The key in C unlocks the door and then promptly vanishes.
>

blue dress
handy lantern
door

Software SCENE

38%

Fine Racer

...pity the driver

FOLLOWING the success of other titles by this French company, I was anticipating a pretty good game here.

The object is to steer your little car around a course, picking up check point flags on the way. You must also avoid the three other cars and holes in the road.

And if you don't finish the race before the other three competitors a vehicle containing the dreaded Mad Max attempts to annihilate you and your poor little purple bumper car.

The packaging consists of a disc and a very poor inlay card, with barely any instructions or key usage. Seven small lines are all that you are given to instruct you on the object of Fine Racer.

Once loaded a menu system appears. Unfortunately due to the poor instructions, it took me many attempts before I discovered how to change the options. These offer you the opportunity of buying extra equipment to both improve and maintain your car – but only after you have obtained some credits.

These are only available by entering the Labyrinth or by taking part in the ultimate race.

Other options are for a training mission and another to adjust how quickly your car will turn sharp corners. Also provided are indicators which inform you of varying degrees of damage to your car, fuel left and the state of your tyres.

Once you're ready to begin you rev the engine, a simple sound track begins, wait for the all clear and you're off! An overhead view of you and the other cars is displayed and an exceedinly small map shows the obstacles you are to encounter.

Control is difficult at times, especially if you bump into another car as it appears to drag you along with it.

Flags numbered one to eight have to be collected as you whizz round the course, but the map doesn't really help and quite often you go sailing past your flag, have to go back, collect it and lose valuable time.

At random positions you'll find extra fuel and credits which are totalled at the end of the race. Your damage meter drops rapidly when you drive over a hole , so avoid them at all costs.

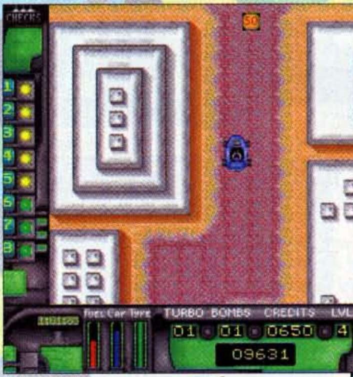
When you finally reach the end – providing you aren't last – you're given extra credits and a chance to repair and buy extra parts for your car. If after repairs you'd like to obtain more credits, enter the Labyrinth for two minutes to pick up extra points and bonuses. Then continue to the next race.

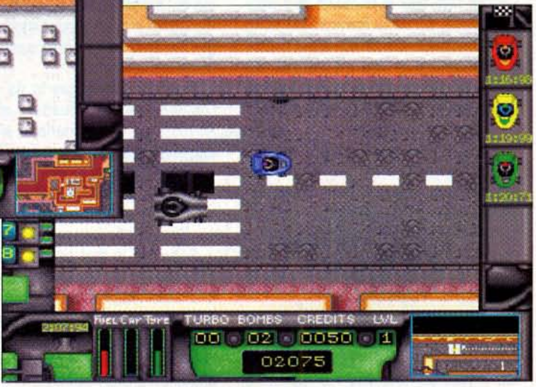
The training option really is diabolical. Once you begin you can't quit unless you drain one of the energy bars to zero.

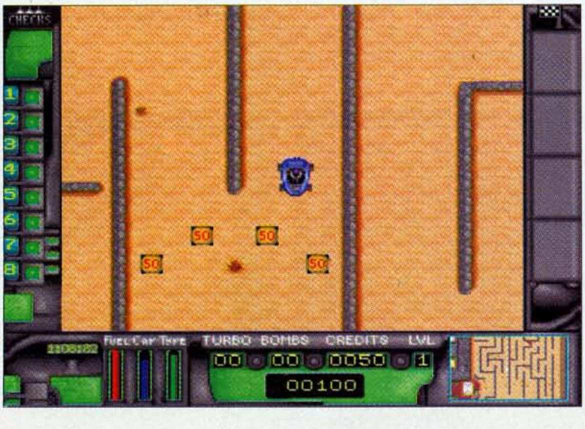
I found Fine Racer difficult to master and not at all addictive. When you consider other titles available at the same price I'd suggest you drive around a bit before spending your money.

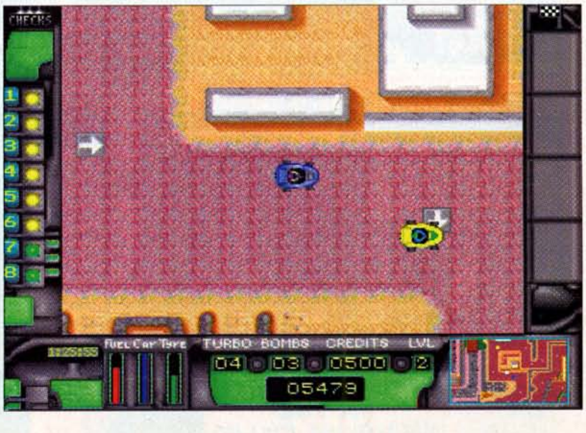
Brett Colley

Price: £19.95
Supplier: Eterna/Vector services,
13 Dennington Rd, Welling borough, Northamptonshire,
NN8 2RL
Tel: 0933 279 300
Requirements: A3000/Archimedes









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Risc-os

GAME FEATURES

Written entirely in highly optimised assembler in 256 colour mode, the program has customised sound generators using 4 stereo sound channels, up to 70 objects on screen simultaneously and beautifully smooth animation. Playability and increasing levels of difficulty make this program a "must" for all arcade-game enthusiasts.

AUTHORS

If you have written or are writing software of commercial standard and would like your work published in a professional manner, please write to Bob Simpson at the address given, preferably with a sample of your program.

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Diary of

Steve Parkinson continues on his trail to glory as writer of a BBC Micro game

March

THIS mad month began just like any other, until I noticed *it*. The lighting on the girders that make up the control towers is completely wrong. It should have been from the top right, but instead was from bottom left. Just wait till I find out who did it...

Having amended that small inconsistency I soldiered on with more important stuff, like setting the borders that determine when an alien has reached its boundaries and can be removed, ready to be put elsewhere.

It appears to work OK, but the whole game is starting to struggle rather than run smoothly. Sooner or later will come a time when there will be nothing I can do to stop the screen glitching.

After a lot of tinkering around, tweaking and general optimisation I decided that the time had come to do something drastic. There's a little rule in programming: If it's getting complicated you're doing it wrong.

I re-vamped the entire sprite plotting routine, responsible for placing absolutely everything into the universe, and eventually came out with a much simplified version. And I've managed to lose four bytes of data per object. Not bad.

This means it won't take so long to process each object and we save quite a bit of memory. Brilliant. Of course a new improved animation routine was needed: Mk II handles eight objects instead of four and runs much faster.

Having streamlined the program with such success I set about installing the algorithm to move the aliens about in the universe. It's enormously difficult giving the aliens intelligent movement so I had a chat with Phil, the play-tester.

We decided that the best random generator is the player himself – and he's the only genuinely natural part of the whole thing. So I set about designing a routine which incorporates such an idea, I'm not relying totally on the player's movements – after all we don't want to hand all the control over to him or her.

Instead we have two counters, running at different rates. When they are equal the direction of the alien is changed to a heading determined by another counter combined with what the player is doing. Good eh? I'm thinking of making the worker alien follow a predetermined course instead of a chaotic one.

This month saw the inclusion of the first control tower. This is the one that you will eventually have to raid and destroy in order to remove some of the barriers. This is an essential part of the game, as the barriers block off selected rocks and stop you getting Arionite from them.

The control towers each have an access code which has to be deciphered before you can enter – hopefully that will go in some time next month.

Girders are used to build the tower, which houses a small entrance hole – on the top as you look down. The ship cannot get through, so instead a small robot pod is sent in. It can use the ship's shields, weaponry and controls.

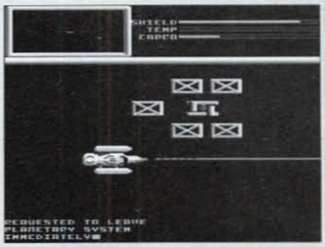
Made the first attempt at designing the screens for the inside of the tower, but I'm not happy about the quantity of memory gulped up. So for now I'll stick to a single screen only and additions to the play area can be made when I know where I stand.

On the other hand I'm happy with the colour scheme, so I set about trying to design the pod – found it difficult to make it different from the ship.

Strange that. I'm obviously not feeling very creative, so just set about incorporating it into the control tower routine. I had to be very careful not to use the same variables as the main routine – for obvious reasons.

Finished the movement routine, which by some strange quirk of fate worked almost straight away. It's not sophisticated, but there's no room for complex stuff in a subgame.

Next on the agenda is collision detection. In Hyperball – what I wrote – the detection was calculated so as to allow for invisible objects and differentiation between similar ones. But in this case I'll use on-screen detection because there's relatively little happening on the screen at any one time... I've just decided that the ship's laser isn't bright enough, I'll change it in a minute...



```
REQUESTED TO LEAVE
PLANETARY SYSTEM
IMMEDIATELY
```

Meanwhile, after finishing off and testing the collision routine, started work on the firing routine. It wasn't long before I had a multi-coloured bullet racing across the screen at breakneck speed. Collision detection would come in handy at this point, methinks.

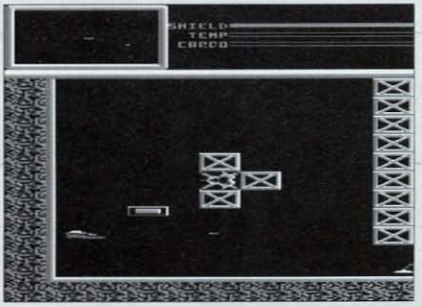
Now to include the nasties: The first is a block that moves steadily up and down in front of the ship. Made use of the same routine as for plotting the ship – all part of the healthy, memory-saving attitude.

Unfortunately it's a bit boring, so decided to swap it for a sine wave-type of up and down motion which would give the impression of inertia.

Scrapped that instantly in favour of an even better idea – a bouncing block. That's it. This was a simple tranformation from the wobbly block. I installed a little switch at the bottom of the screen which, when shot, removes two girders that support the block and allow it to start bouncing.

Attempted to design a graphic for the target inside the tower but still couldn't dredge up any artistic skill. Instead we're stuck with a rather small Mandelbröt until I think of something better.

Once I was happy with the routine in general I linked it up to the main routines so that it runs as soon as you fly into a control tower. Added a small counter which clocks how many times you hit the target and throws you out when it reaches a certain number.



Unfortunately, on returning to the spacecraft I noticed that certain elements of the starfield had begun the infamous hide-and-seek syndrome. A quick analysis showed that I'd used some of the same variables inside the tower that were reserved for the starfield only. Ooops. Easily fixed though.

a game

April

BEGAN the month by having a general think and came to the conclusion that there might not be enough levels. Let's see... there's 300 years difference between 2041 and 2341, jumping in 50 year steps gives six levels. Hmm, I'd rather have twelve levels by altering the dates from 2341 to 2641. No marks for forward planning there.

Installed a simple firing routine for the aliens – was going to give them all top-of-the-range laser cannons as well, but the current trend is towards making the opposition slower. Bit unfair that.

So they get bullets which are slower than lasers but still don't give you much time to get out of the way.

Hit April's first bug – the bullet zoomed away and off the screen (as planned) but just kept on going (not planned). Philosophically speaking you may argue that just because the bullet is not on the screen doesn't mean it's not still flying off into oblivion. Well that's true. But it's my game and logic doesn't count!

The next step was to include firing in all four diagonal directions, which wasn't hard. The difficult bit was trying to add some logical relationship between the movement of the alien and the firing. To give the alien real intelligence would require making it aware of its surroundings and its own existence.

Perhaps a little controlled randomness will do – self-modifying neural networks can wait for a rainy day. The movement will have to be fairly random so that the player can't predict what the next move will be. So I scrapped what I did last month – it just wasn't random enough.

The routine that related the alien's movement with the player's stayed – because it worked – but now I tested a Basic program with three counters, X, Y and Z: The first goes up in steps of five, Y goes up in steps of X and Z in steps of Y. The result seems random enough.

Armed with this algorithm I converted it to machine code – very easy as I wrote it with that in mind. The alien border was set up last month, and incorporating the new routine to control the re-positioning of aliens was soon accomplished. They appear much more randomly distributed now, although there's a slight bias towards appearing in front of your ship.

Added collision detection for the bullets to reduce the shield strength when hit. Upgraded the ship's collision detection as well to see if the object hit is an alien. If it is the alien is destroyed and then relocated on the border ... hmm I haven't done the death sequence yet.

Let's look at the memory situation. Not too good, there's still plenty of essential stuff to be done and there's a lot of graphics being used up by the space and planet routines. Something's got to go. So it's goodbye to the weapon icons in the planet routine, they look nice but take up too much room.

> *‘The bullet just kept on going’*

After a fair bit of pondering, dithering and fidgeting I scrapped the lot and set about writing a completely new planet routine, and managed it much more quickly than I'd expected.

This time I'm using the same graphics as the space routine with a few extras tagged on the end. Now I know exactly where I stand and there's just one sprite file to worry about. Jubbely!

I also re-used all the routines that already existed instead of writing new ones – like the *move thing up or down one pixel* routine – but had to change it to more than one pixel in order to get faster movement.

Put in a long assault course of blocks to be dodged. This took a bit longer as it had to run fairly smooth and fast. And it does, until there are too many blocks on the screen, but there isn't much I can do about that.

Incorporated some little fuel bubbles for you to collect on your journey – these were cunningly nicked from one of the alien sprites, which enables me to animate them. Other additions were the gun emplacements which fire blocks up the screen.

The next stage of the planet sequence is a high-speed land chase. The main problem here was getting the craft to react to the grond properly.

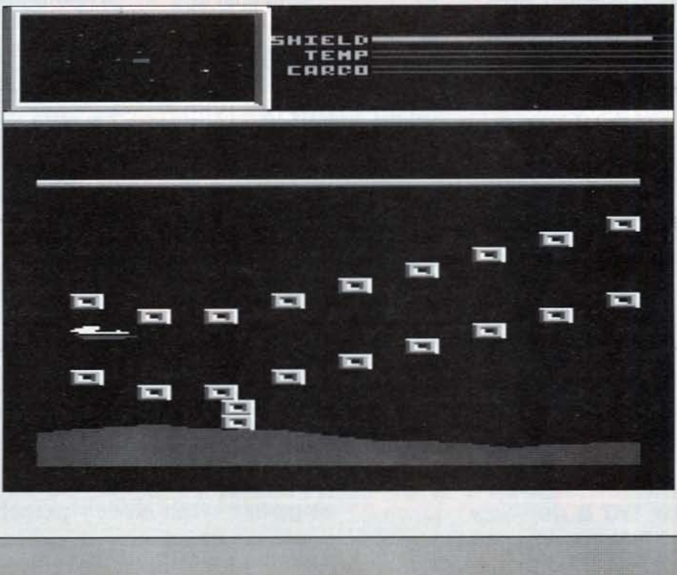
This called for very precise collision detection, which was up and running very quickly.

The craft is automatically pushed upwards as the terrain ascends and floats back down due to slight gravitational forces. Great!

The craft you're chasing was easy to add as well. It uses exactly the same routine, but printed further along the screen. Just changing the graphics pointer gives the impression of two completely different machines.

Didn't get time to put in the firing routine for this one – that'll have to wait. Off on me hols for two weeks now – it's a hard life. This won't give me much time at the end of May. Looks like the Scrumpy Jacks will have to wait.

● *Will he be able to tie the planet sequence in with the space sequence? Will we ever see the lovely weapon icons again? And will he take his Beeb on holiday with him, like a true pro? We'll see.*



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PROBLEM SOLVED

Your technical questions answered by MIKE COOK

Comms by Elk

I AM very new to the art of comms by computer and would like to know some basic things. I have an Acorn Electron, Plus 1, Cumana CS400 40/80 disc drive, PRES Plus 4, printer, Project Expansions User Port and Answercall Manual Mini Modem (MM-100/UK) which runs at 300 baud only.

The modem has a 25 way D type connector and I assume I have to replace it with the 20 way IDC connector so that it will plug into the User Port. If so, what do I connect to what?

Assuming I now have all the hardware I need and I'm plugged into the phone line, how do I find out the phone numbers of suitable bulletin boards? Is there some sort of directory? Or perhaps there's one you could tell me about that would then lead me to others?

Okay, so I've got my hardware, software in the form of Mini Office Comms and the phone number ... what do I do now? As usual the manual assumes a certain degree of knowledge and I have none. I assume there are particular procedures for doing things, but what do I do if nothing happens? – **G. Emson, Farnham, Surrey.**

● *The modem is not connected to the 20 way User Port but to the 5 pin serial port. The lead is made up in the same way as if to talk to a serial printer – shown in the User Guide. Equipped with this and a comms package you are ready to begin.*

You can get the phone number of lots of bulletin boards from any other bulletin board. Yes I know this is a little silly, so here are a few to start off: Archive 0603 745932, World of Cryton 0749 679794 and Noah 0272 572322.

Another one I like is Starbase One, 071-733 3992, which has lots of astronomy stuff on it. Most bulletin boards are run by individuals and there is a lot of coming and going.

In addition British Telecom seem to have a policy of constantly changing numbers every few years, so that you are forced to use their very expensive directory inquiries.

Having dialled the number and not got an engaged tone it should ring out about three times and then you will be answered by a tone. Your modem should then be sending a tone back. Press Return a few time and the modem at the other end should lock on to your baud rate and present you with an opening message.

You are usually asked to type your name and location. If it says ID just type your name. Don't worry about what to type, most systems run on a series of menus where you have to type a single letter or number for a service. In other words you are always prompted what to do. *If you are not successful in getting a connection it could be that your data format in the computer is set up wrongly. Most bulletin boards use either seven bits/even parity or eight bits/no parity.*

The first time you go on to a board set the computer to save all the stuff it sends you and then you can read the instructions at your leisure.

Quest for speed

I HAVE a very old 6502 second processor – number 208,000 issue 1 – which I use with my Model B. It has a lot of flying leads between chips and even a piggybacked one. It's powered from the Beeb but doesn't overheat for a good while.

Recently I decided to fit Basic 4 so I bought a couple of 65C02 chips with the extra instructions and fitted one in the BBC Micro and one in the second processor. The new Basic ran perfectly and about 20-25 per cent faster.

Then I noticed that the chips were 4MHz versions, I knew there was no possibility of speeding up the front end, but the Master Turbo goes at 4MHz, so why not try increasing the speed of my second processor?

I know that all LS/TTL chips respond fast enough and the memory was marked -15 which means 150ns, which ought to be good enough since I need only 250ns response.

I bought a 16MHz crystal to replace the 12MHz on the assumption that the 12MHz clock is divided by 4 to get 3MHz, so with a 16MHz crystal I'll get a 4MHz clock.

It appeared to work okay at first, or at least it powered up and gave the Basic prompt. I ran my speed checking program – count for 10 seconds and see how high it gets – but it crashed with:

```
Mistake at line 60
```

I then tried one that didn't rely on the

➤

Keyboard capers

I OFTEN have trouble with keys not working on my Master Compact and in extreme cases I open the case and take a vacuum cleaner to it, but this doesn't always work. I'm a bit unsure about taking the contact board apart any further, so how can the contacts be cleaned? – **Len Noble, Leicester.**

● *The Compact uses a membrane keyboard and on no account should the membrane be opened as you will admit more dirt than you could ever hope to remove and you will never get it closed again.*

Most problems with keyboards of this sort are caused by surface corrosion and not dirt. As far as I know two types are used on the Compact, sealed and unsealed.

It is a waste of time trying to do anything with a sealed contact. However if it is unsealed you could try a little contact cleaning solution. Trouble is that it leaves a sticky deposit that holds even more dirt, making cleaning a frequent task.

Data transfers

RECENTLY a colleague bought an Amstrad PCW for word processing. But since then we've come to realise that it's quite important to be able to transfer data between his PCW and my BBC A3000.

At first I thought I could do it using a variaty of disc editors and utilities, but I was forgetting one important fact: The PCW has a 3in disc drive which rules out simple transfer, and I've never seen a serial port on the back of a PCW. The only answer is typing it all in again.

Is there any easy solution to our problem? – **Stephen Mumford, Bolton, Lancs.**

● *You can fit almost any 3.5in drive to the Amstrad, however I think that using disc sector editors might prove a little complex as you would need to know a lot about both types of disc filling system.*

You can get serial ports for the PCW, so you could try an appropriate dealer.

However, I think there is a better solution which I used quite a few years ago to transfer my early Body Build articles from a Tandy TRS80 to the Model B.

What you need is a User Port for your A3000, and these are readily available. You then wire it up to the printer port of your Amstrad, with the strobe going to CB1 and the Busy going to CB2.

Next you write a little routine that makes the A3000 look as if it were a parallel printer. Then just command the Amstrad to print and gather it up in the A3000. Having rescued the data from an Amstrad you will not want to transfer it back again.

HELP

➤

front end: Count up to 10000, how long does it take? This worked but with silly results: 0.65 seconds.

From this I thought there might be an intermittent memory problem, so I tried a simple memory checker: Write to all locations, read them back and check they're okay. This inexplicably stopped at &900, &2900, &4900 and &6900 – it should have just reported the error and continued.

I checked the supply voltages and discovered it was only 4.75V in the second processor. Assuming that this was just not enough, and knowing that chips run a bit faster with a higher voltage, I hooked up a separate supply of just over 5V.

The memory checker worked properly but the other two programs still gave silly results.

I'm at a complete loss as to what to do next. What do I have to do to get it run at 4MHz? – **John Robinson, Edinburgh.**

● *Your problem is almost certainly that of access time with your memory chips. When a processor is running at 4MHz the clock cycle time is 250ns, however this is not the access time required for memory access.*

This is because a lot of other things have to happen in this 250ns as well as your memory responding.

For example, the address lines have to stabilise, your memory has to respond and the processor has to clock in the data. So you see you need an access time shorter than the clock cycle time.

I do not have the data sheet for the 4MHz processor but I have one for the 2MHz one and in that the required memory access time is quoted at 300ns. So it would be reasonable to expect an access time of 150ns for your 4MHz device.

Now if you are using 150ns devices you are just on the edge of operation, and I would expect the problems you report.

Remember, the memory devices are tested under the most favourable conditions and not in the real world with low supply voltages and heavy capacitive loading.

Therefore I would get some faster memory chips, 100nS might do at a pinch, but I would be inclined to go for 80nS ones if you can get hold of them.

PROBLEM SOLVED

HELP

Cartridge crashes

I AM experiencing problems when two fully occupied Quad rom cartridges are installed in my BBC Master. The symptoms are screen corruption and/or crashes whenever access is made to any roms – not necessarily those in the cartridges.

I can cure the problem by removing two, or sometimes one, of the roms in the cartridges, so I suspect I am capacitively overloading the bus lines in the machine.

Do you think this is likely, and if so, do you think replacing the existing eproms with cmos varieties will cure the problem? – **H. L. Smith, Ipswich.**

● *Your detective work is probably correct in that the problem lies in the roms, so replacing them might affect a cure.*

However, the signals to these line are buffered, so I would expect them to work with most types of chips.

If the problem persists you could try replacing the data buffer IC7 74LS373 with an ALS or HC version.

Compact-Master transfers

I HAVE both a Compact with its single 3.5in drive and a Master 512 with double 5.25in drives and I want to transfer files between them and do back-ups in this way.

I have a number of manuals and appropriate computer books but nowhere can I find how to hook up external drives, nor are there any direct instructions on how to hook up the two machines via their serial ports.

Can the files be backed up direct from one format to another and can any drive be used?

For example, a Combo dual drive used with an Atari ST equipped with a 40/80 option and an A/B drive option fails to work even with its specially made up cable – although the drive light comes on.

With Acorn drives I've been told that internal jump links must be altered to enable the drive to act as number 1 or number 2, and that a resistance pack must be put in, or taken out, according to the settings. What are the instructions? – **Len Noble, Leicester.**

● *As you have already discovered, there is never a book that tells you exactly what you want to know – because you are probably the only person who wants to know that exact thing.*

What you have to do is to acquire knowledge about the topic and then you can apply it to your own problem. Let's start with a few fundamentals and see where we get to:

The serial port is a great way of communicating between computers of all sorts because it uses a standard method. However there are so many variations of that standard that you could get lost.

There is supposed to be a standard connector for serial ports but this is so large, expensive and has many unused pins that many computer manufacturers have decided to use their own.

However, simply connect the data out of one computer to the data in of the other and connect the CTS of one to the RTS of the other – and vice versa.

This should be a good starting point and will allow transfer between the Master and Compact. Then you need a way of sending files of information on one computer and receiving it on the other. The simplest solution is to run some form of comms package on each machine.

However Acorn has arranged things slightly simpler if you just want to transfer Basic programs:

- *Set each machine to the same baud rate with *FX7,4 and *FX8,4*
- *On the receiving machine now type *FX2,1. This machine will now appear to hang up.*
- *Load in from disc the program that you want to send. Then type *FX3,1 followed by LIST followed by *FX2,0 and finally *FX3,0*

The receiving computer will now have a copy of the program which you can save in the normal manner. Note this will only work for programs that can be directly typed in at the keyboard, as you can't list data files or machine code you can't transfer them using this method.

Most disc drives in most computers are the same, these are called standard drives. The exceptions to this is intelligent drives like those with SCSI or IEEE interfaces or stupid drives as used in the Apple II.

Even intelligent drives normally have a standard drive that could be obtained by dismantling it.

All standard drives, no matter what manufacture's name is on them, have common features. These are the signal connector, option links and terminating resistors. However, the latter two often look physically different.

There are two physical types of signal connector one for 5.25in and one for 3.5in most of the electrical signals are the same from drive to drive. However, the older 5.25in drives often need a lower impedance drive than the newer 3.5in ones, hence the buffer boards sold to connect 5.25in drives to computers like the Archimedes.

No matter how many drives are connected to the computer the signals are common to each drive – this gives what is called a daisychain arrangement. The last drive in the chain, that is the one that gets the signals last, has to be fitted with a terminating resistor.

This stops signals being reflected at the end of a line and interfering with new signals, rather in the same way as an echo or ghosting on a TV set. In addition, the terminating resistor acts as pull up, making the signal voltage level correct for driving the board.

As manufactures do not know if any particular drive is going to be the last one in the chain, all standard drives are equipped with a pack of resistors that can be removed or left in place as appropriate.

In order for a drive to know when to respond to the signals from the computer it must tap into a drive select signal, and each drive should tap into a different one – this is what the drive select link does.

The link can take many differentl forms. Ones I have seen include small slider switches, dual in-line headers with mechanically snipped links and jumper links like those found inside the computer.

There is a link for each drive select line – normally marked DS0, DS1 and so on. Only one of these must be made on a single drive.

One of the other links is normally labelled MUX, indicating that the drive is to live on a daisychain with others, and it should always be made.

Routine MATTERS

IF you have written a routine that may be of interest to other readers, and may be suitable for publication in this column, do not hesitate to send it in on tape or disc along with documentation to: *Stephen Wade, The Micro User, Europa House, Adlington Park, Macclesfield SK10 4NP.*

Don't forget to tell us your telephone number, and enclose a stamped addressed envelope to guarantee the return of your media.

Going round in circles

Author: Pete Goodliffe
Language: Basic
Filename: Circles

MANY home micros incorporate a Basic command which enables you to draw both filled and outlined circles easily. Unfortunately, the Electron and 8 bit BBC Micro range are not among them and all we have are line and triangle plotting facilities.

This means that any attempt to produce a circle on screen requires either many lines or triangles to be plotted next to each other.

The program below is of no exception to the rule, but is remarkably fast on even the Electron when compared to many similar programs – even though it is only written in Basic.

There are two short procedures, *PROC-CIRCLE* and *PROC-FCIRCLE*. The former plots an outlined circle by way of the SIN and COS functions, the latter employing a more complex mathematical formula to draw filled circles. Both procedures require three parameters to be passed when called:

X co-ordinate of circle's centre
Y co-ordinate of circle's centre
Radius of the circle

The plotting routine is self-contained within the procedure in an attempt to maximise speed. Should you wish to alter the step distance between points simply alter the value in the correct procedure. Doing this will have some effect on the speed – the smaller the step size, the longer the program will take to execute.

```
   10 REM Circles
   20 REM by Pete Goodliffe
   30 REM (c) The Micro User
   40 MODE 0:GCOL 3,1:VDU 23,1,0;0;0;0;
   50 FOR M=100 TO 400 STEP 50:PROC_FCIR
CLE(640,510,M):NEXT:FOR M=100 TO 400 STE
P50:PROC_CIRCLE(640,510,M-10):PROC_CIRCL
E(640,510,M+10):NEXT
   60 M=420:REPEAT PROC_CIRCLE(640,510,M
):M=M+(M^2/10000):UNTIL M>700:END
   70 DEF PROC_CIRCLE(X,Y,R)
   80 MOVE X,Y+R:FOR N=0 TO 12.3 STEP.3
   90 DRAW X+R*SIN(N/6*PI),Y+R*COS(N/6*P
I):NEXT:ENDPROC
  100 DEF PROC_FCIRCLE(X,Y,R)
  110 FOR N=-R TO R STEP 4:MOVE X-SQR(R^
2-N^2),Y+N:DRAW X+SQR(R^2-N^2),Y+N
  120 NEXT:ENDPROC
```

Petrol price converter

Author: Peter Shaw
Language: Basic
Filename: Gal/Lit

IT is currently becoming more difficult to compare petrol costs as most service stations are only advertising their prices in one of the two possible formats.

Where the price is advertised in gallons at one garage and litres at the next, it is often difficult quickly to decide which is the cheaper.

Using the fact that there are 0.22 litres in a gallon, it is possible to write a short program to convert prices between the two bases. This means that you can easily make all the prices of the same base, and so compare them with ease.

The listing below prints answers in gallons to the nearest penny and those in litres to the nearest tenth of a penny.

You can either convert prices when you get to home or work – depending on where your micro is situated – or use it to draw up a small price conversion chart for use in you car.

```
   10 REM Petrol Price Converter
   20 REM by Peter Shaw
   30 REM (c) The Micro User
   40 REPEAT:MODE 7:VDU 23,1,0;0;0;0;
   50 title$="Petrol Price Converter"
   60 PRINT CHR$(141);SPC(8);title$
   70 PRINT CHR$(141);SPC(8);title$
   80 PRINT CHR$(145);SPC(8);STRING$(22,
",")''':ga$="Gallons":li$="Litres"
   90 PRINT "1) ";ga$;" to ";li$
  100 PRINT "2) ";li$;" to ";ga$
  110 PRINT "3) Exit program"
  120 PRINT ''''':A=GET:IF A=49 PROCgl
  130 IF A=50 PROClg
  140 IF A=51 MODE 7:END
  150 UNTIL FALSE
  160 DEFPROCgl:PRINT "Price per gallon
: `";:INPUT ""G:G=G*1000:L=INT(G*.22+.5)
:PRINT '"That's ";L/10;"p per litre"''''"
Press any key...":A=GET:ENDPROC
  170 DEFPROClg:PRINT "Price per litre (
in pence) : ";:INPUT ""L:@%=&20202:L=L*1
0:G=INT(L/.22+.5):PRINT '"That's `";G/10
00;" per gallon"''''"Press any key...":@%
=0:A=GET:ENDPROC
```

A tasty menu

Author: Robin Greenaway
Language: Basic
Filename: MenuPrg

NO disc is really complete without a menu system to front it, and the one presented here is kind on memory, easy to customise to your discs contents and, above all, simple to use.

The program is written in procedural form – in all five different ones are used. The first, *PROCinit,* initialises a dimension for the number of option strings to be presented on the menu.

Next comes *PROChead* which is used to display a title in double height on a coloured background using teletext control code techniques. *PROClist* reads the menu item strings from the DATA statements at the end of the program and prints them in one or two neat columns depending on how many there are, neatly indenting the numbers as it does so.

Input is conducted through *PROCinput* which prompts for the number corresponding to the required menu item to be entered. Within the procedure error trapping checks for out-of-range values and repeats the input until an acceptable value is entered.

Finally PROCload is called in order to load the appropriate program into memory. A list of *IF A=x* instructions is used to do this, thus enabling all manner of operations to be performed: For example programs can be CHAINed, *RUN and specific directories can be selected.

```
   10 REM Menu program
   20 REM by Robin Greenaway
   30 REM (c) The Micro User
   40 MODE 7:PROCinit:PROChead:PROClist:
PROCinput:PROCload:END
   50 DEF PROChead:PRINT CHR$141;CHR$131
;CHR$157;CHR$129;TAB(19,0);"MENU":PRINT
CHR$141;CHR$131;CHR$157;CHR$129;TAB(19,1
);"MENU":ENDPROC
   60 DEF PROClist:X=1:Y=4:I=3:REPEAT
   70 READ name$(X):IF name$(X)="END" TH
EN ENDPROC
   80 IF X=10 THEN I=2
   90 IF X>10 AND X<21 THEN I=21
  100 Y=Y+1:IF Y=15 THEN Y=5
  110 IF name$(X)="END" THEN ENDPROC
  120 PRINT TAB(I,Y);X;" ";name$(X):X=X+
1:UNTIL FALSE:ENDPROC
  130 DEF PROCinput
  140 INPUT TAB(2,18);"Choose the number
 of the program you    want to run "A$
  150 IF VAL(A$)<1 OR VAL(A$)>number THE
N PRINTTAB(10,19)SPC30:PROCinput
  160 A=VAL(A$):ENDPROC
  170 DEF PROCload
  180 IF A=1 THEN CHAIN "FIRST"
  190 IF A=2 THEN *SECOND
  200 IF A=3 THEN *DIR $.DIRECT
  210 IF A=3 THEN CHAIN "THIRD"
  220 END
  230 DEF PROCinit:number=15:DIM name$(n
umber+1):ENDPROC
  240 DATA "FIRST","SECOND","THIRD","FOU
RTH","FIFTH","SIXTH","SEVENTH"
  250 DATA "EIGHTH","NINTH","TENTH","ELE
VENTH","TWELFTH","THIRTEENTH"
  260 DATA "FOURTEENTH","FIFTEENTH"
  270 DATA "END"
```

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Polish your picture

Brian Webb shows how to use a BBC Micro to trace faults on your monitor or TV

A TV repair technician uses a set of test display patterns to help in assessing problems with – and fixing – the alignment of monitors. This program gives you a set of screens that can help in DIY diagnosis.

The limitations of using the BBC Micro for display alignment is rather obvious – it does not cover the whole screen. A border exists at both north-south and east-west of the display so there's no set of colour bars which show black and white, as white at the extreme west of the display cannot be displayed.

All you have to do is type in the program, ensure you've made no errors using the checksums, and run it. Each of the options is described below with the particular feature of the monitor that it tests. Of course you shouldn't try fiddling around inside your monitor or TV as the voltages used can be lethal, but you'll be able to see what might need adjustment.

Cross-hatch and circle: This is to align the red, green and blue guns, so as not to show overlap. The circle can also show incorrect setting of the height controls.

Dots: This has very much the same requirements as the cross-hatch, only is much more critical.

EHT: Unfortunately we are still stuck with the cathode ray tube display and consequently EHT (Extremely High Tension voltages at the final anode – as much as 25,000 volts on a 26in tube – if beam current flows with peak whites the EHT voltage drops.

This in turn causes electrons attracted to the final anode of the CRT to expand – a process known as *breathing*. Normal commercial TVs do not bother too much with correction circuits, they simply overscan so that breathing is not as noticeable. This is not really desirable with a monitor and depends upon the degree of sophistication to control the regulation of the EHT voltage in the circuitry design. Regulating very high voltages can be expensive. Watch the border lines, especially east-west.

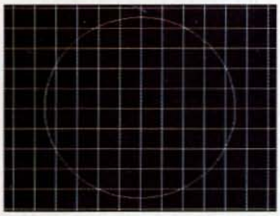
Chroma bars: All manufacturers of colour TVs publish service manuals of their products which includes fault tracing and alignment of the colour decoder. Oscilloscope reproductions are used to show the display at critical test points on the circuit.

Assuming correct working of the circuit, injecting chroma bars at the aerial or at composite video, will show the correct oscilloscope displays.

With a set of standard colour bars either transmitted or generated in a purpose-built unit, white is shown at the extreme west and black is shown at the extreme east of the display. As both black and white represent zero voltage at the decoder, alignment can be achieved with this display.

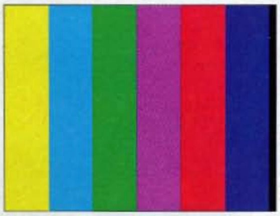
High frequency: The output of random lower case letters in Mode 0 shows up lack of high frequency bandwidth.

A VDU with RGB input should display this screen with good definition.

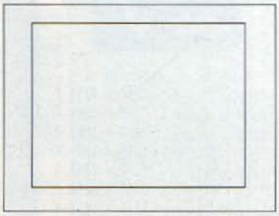


Crosshatch and circle

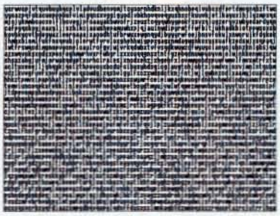
Dots



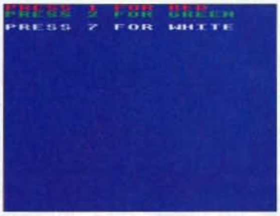
Chroma bars



EHT

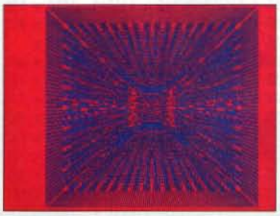


High frequency

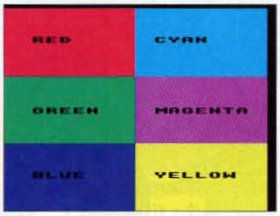


```
PRESS 1 FOR RED
PRESS 2 FOR GREEN
PRESS 7 FOR WHITE
```

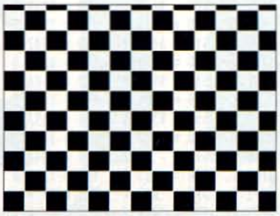
RGB rasters



PAL crocc-colour



Complementary colours



Chequerboard

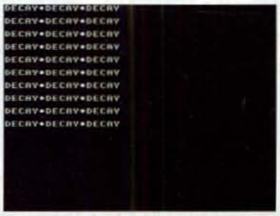
RGB rasters: Red, green, blue and white rasters are necessary for detecting and aligning colour purity of the cathode ray tube. This is achieved by adjusting the coils on the neck of the CRT and should only be attempted by a trained technician.

Complementary colours: Should a PAL colour decoder have a fault, usually associated with the *ident* circuits, this can be readily detected by the incorrect colours being displayed, for example, blue for yellow and yellow for blue. Blue being the complementary colour for yellow.

PAL Cross-colour: It must be remembered that our present PAL colour television system is based on technology available over 20 years ago and has certain inherent faults.

One of these was lack of available bandwidth to transmit both the luminance and chroma information separately. Consequently the chroma sidebands are placed at the high frequency end of the luminance spectrum. The luminance is, to a degree – depending on circuitry filters decoded

➤



```
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
DECAY•DECAY•DECAY
```

Decay

➤

by the chroma decoder circuits – causing cross colour.

I have included this pattern to demonstrate the difference with the signal encoded in PAL and subsequently decoded at the PAL colour decoder.

This would mean injecting it at the aerial socket or at composite video or not encoding and decoding PAL by using the RGB facility if available.

If this is possible, you may like to try this and *vive la difference*. Looking to the future, the coming of satellite TV – encoded with the D-MAC format – will see the elimination of this problem.

Chequerboard: This display will show overall linearity of the raster. Lack of low frequency response will be noticeable by the black squares smearing into the whites.

Decay: Should the display appear to persist after switch-off, then the tube is ageing. A replacement tube may be required.

```
   10 REM TV PATTERN GENERATER
   20 REM by Brian Webb
   30 REM (c) The Micro User
   40 MODE6:VDU19,0,4;0;
   50 PRINT'TAB(7)"Pattern Generator"
   60 PRINT'TAB(7)"A_____Cross-hatch &
circle"
   70 PRINT'TAB(7)"B_____Dots"
   80 PRINT'TAB(7)"C_____E.H.T."
   90 PRINT'TAB(7)"D_____Chroma bars"
  100 PRINT'TAB(7)"E_____High frequency
"
  110 PRINT'TAB(7)"F_____R G B rasters"
  120 PRINT'TAB(7)"G_____Complementary
colours"
  130 PRINT'TAB(7)"H_____PAL cross colo
ur demo"
  140 PRINT'TAB(7)"I_____Chequer displa
y"
  150 PRINT'TAB(7)"J_____Decay"
  160 PRINT'TAB(7)"Press Space bar to re
turn here"
  170 REPEAT VDU7
  180 select%=INSTR("ABCDEFGHIJ",CHR$(GE
TAND&5F))
  190 UNTIL select%>0
  200 ONselect%GOSUB240,330,410,490,580,
630,760,980,1120,1220
  210 GOTO40
  220 :
  230 REM CROSS-HATCH AND CIRCLE
  240 MODE1:FORI=40TO1300STEP 100
  250 MOVE I,0 :DRAW I,1023 :NEXT
  260 VDU20:FORI=10TO1100 STEP 100
  270 MOVE0,I:DRAW1300,I:NEXT
  280 MOVE638,965:FORI=0TO2*PI+.1 STEP .
1
  290 DRAW638+450*SIN(I),515+450*COS(I):
NEXT
  300 PROCspace:RETURN
  310 :
  320 REM DOTS
  330 MODE2:FOR X=91 TO 1188 STEP 91
  340 FOR Y=0 TO 1023 STEP 64
  350 MOVE X,Y:DRAW X,Y+1
  360 NEXT:NEXT
  370 VDU23,1,0;0;0;0;
  380 PROCspace:RETURN
  390 :
  400 REM EHT
  410 MODE0:MOVE2,2:DRAW1277,2
  420 DRAW1277,1021:DRAW2,1021:DRAW2,2
  430 REPEAT
  440 VDU19,2,0;0;:PROCwait(55)
  450 VDU19,2,7;0;:PROCwait(55)
  460 UNTILINKEY0=32:RETURN
  470 :
  480 REM CHROMA BARS
  490 MODE2:RESTORE 550
  500 VDU20:FORI=0TO1247 STEP 208
  510 READC:GCOL0,C:PLOT4,I,0
  520 PLOT4,I,1023:PLOT85,I+207,0
  530 PLOT85,I+207,1023:NEXT
  540 PROCspace:RETURN
  550 DATA 3,6,2,5,1,4
  560 :
  570 REM HIGH FREQUENCY
  580 MODE0:FOR N%=1 TO 2560
  590 VDU RND(26)+96;:NEXT
  600 PROCspace:RETURN
  610 :
  620 REM RGB RASTERS
  630 MODE2
  640 COLOUR1:PRINT"PRESS 1 FOR RED"
  650 COLOUR2:PRINT"PRESS 2 FOR GREEN"
  660 COLOUR4:PRINT"PRESS 4 FOR BLUE"
  670 COLOUR7:PRINT"PRESS 7 FOR WHITE"
680 REPEAT K%=INSTR("1247 ",GET$)
  690 Q%=VALMID$("1247 ",K%,1)
  700 UNTIL K%>0
  710 IF K%<5 VDU19,0,Q%;0;
  720 IF K%=5 RETURN
  730 GOTO680
  740 :
  750 REM COMPLEMENTARY COLOURS
  760 MODE2
  770 VDU24,0;0;620;335;
  780 GCOL0,132:CLG
  790 VDU24,0;336;620;670;
  800 GCOL0,130:CLG
  810 VDU24,0;671;620;1005;
  820 GCOL0,129:CLG
  830 VDU24,620;0;1239;335;
  840 GCOL0,131:CLG:
  850 VDU24,620;336;1239;670;
  860 GCOL0,133:CLG
  870 VDU24,620;671;1239;1005;
  880 GCOL0,134:CLG:COLOUR0
  890 COLOUR129:PRINTTAB(2,5)"RED"
  900 COLOUR134:PRINTTAB(11,5)"CYAN"
  910 COLOUR130:PRINTTAB(2,16)"GREEN"
  920 COLOUR133:PRINTTAB(11,16)"MAGENTA"
  930 COLOUR132:PRINTTAB(2,26)"BLUE"
  940 COLOUR131:PRINTTAB(11,26)"YELLOW"
  950 PROCspace:RETURN
  960 :
  970 REM CROSS COLOUR DEMONSTRATION
  980 MODE0:D%=10
  990 VDU19,2.RAD(3)+1,0,0,0
 1000 VDU19,3.RAD(3)+4,0,0,0
 1010 VDU29,694;512;:J1%=0
 1020 FORK%=500TO380 STEP-40
 1030 REPEAT J2%=RND(3):UNTILJ2%<>J1%
 1040 J1%=J2%:GCOL3,J1%
 1050 FORI%=-K%TOK% STEP D%
 1060 MOVEK%,I%:DRAW-K%,-I%
 1070 MOVEI%,-K%:DRAWI%,-K%
 1080 DRAW-I%,K%:NEXT:NEXT
 1090 PROCspace:RETURN
 1100 :
 1110 REM CHEQUER BOARD
 1120 MODE0:VDU20
 1130 FORI=0TO1250STEP100
 1140 FORJ=0TO1050STEP100
 1150 C=C+1:IFC/2=INT(C/2)THEN1180
 1160 MOVEI,J:PLOT4,I,J+92
 1170 PLOT85,I+92,J:PLOT85,I+92,J+92
 1180 NEXT:NEXT
 1190 PROCspace:RETURN
 1200 :
 1210 REM DECAY
 1220 MODE1:*FX9,20
 1230 VDU19,3,15;0;:*FX10,100
 1240 FORX%=1TO10
 1250 PRINT"DECAY*DECAY*DECAY"'
 1260 NEXT
 1270 PROCspace:RETURN
 1280 :
 1290 DEFPROCspace
 1300 REPEATUNTILGET=32
 1310 ENDPROC
 1320 :
 1330 DEFPROCwait(T%)T%=TIME+T%
 1340 REPEATUNTILTIME>T%:ENDPROC
```

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If you prefer to save the wear and tear on your fingers you'll find this listing – together with all the others from this issue – on this month's disc, sent free if you subscribe to *The Micro User*.

```
  10 =    0 0   160 = B14D 1   310 = 9719 F   460 = E562 4   610 = 9719 0   760 = DA59 9   910 =  AE6 6  1060 = 4FF2 2
  20 =    0 0   170 = E3F6 B   320 =    0 F   470 = 9719 0   620 =    0 0   770 = E78F C   920 = 549C E  1070 = 254F 8
  30 =    0 0   180 = 1B19 B   330 = 1E51 3   480 =    0 0   630 = DA59 8   780 = ADB2 C   930 = 1210 0  1080 = D2A7 7
  40 = 915A A   190 = 9C31 8   340 = 2E11 4   490 = DE66 E   640 = EC3B 2   790 = 8755 3   940 = 661C 1  1090 = 5E05 9
  50 = 3C7A 3   200 = 1A2A 8   350 = 7BDC 8   500 = FC83 B   650 = 19B7 1   800 = C3D2 5   950 = 5E05 3  1100 = 9719 C
  60 =  93D 3   210 = B4AC 3   360 = 24BD 7   510 = 5CB1 8   660 = 2902 F   810 = 4206 7   960 = 9719 7  1110 =    0 C
  70 = 1702 0   220 = 9719 1   370 = 1E64 6   520 = 119A 7   670 = 6264 0   820 = 2BF7 B   970 =    0 7  1120 = D992 0
  80 = D60F 3   230 =    0 1   380 = 5E05 2   530 = 994D 9   680 = D5C6 5   830 = 2372 E   980 = C2F3 7  1130 = 1299 3
  90 = 79C2 A   240 = 4C68 2   390 = 9719 1   540 = 5E05 9   690 = 2482 E   840 = DA82 B   990 = 11EF F  1140 = 77E5 1   1210 =    0 0   1280 = 9719 7
 100 = A721 D   250 = 5E98 2   400 =    0 1   550 = 9381 4   700 = DA37 E   850 = BE84 8  1000 = 1329 D  1150 = 7B8E 7   1220 = 88ED F   1290 = CE98 F
 110 = A434 9   260 = 26D2 1   410 = 2CC5 7   560 = 9719 7   710 = 3668 3   860 = 9A82 9  1010 = 6578 F  1160 = FD73 E   1230 = C2AA 4   1300 = 5B81 9
 120 = 4247 6   270 =  6B6 5   420 = 3BA6 6   570 =    0 7   720 =  84D 3   870 = DBF9 1  1020 = C837 3  1170 = E2F8 2   1240 = 971F D   1310 = ED0F F
 130 = 2110 D   280 = 7E33 8   430 = BFBA C   580 = 6C63 F   730 = 1228 B   880 = F14F C  1030 = 5E12 4  1180 = 24BD F   1250 = 1B3E C   1320 = 9719 0
 140 = 91DA D   290 = 75C8 8   440 = 5F72 5   590 =  B32 4   740 = 9719 4   890 = 81AF C  1040 = B552 3  1190 = 5E05 A   1260 = 2C83 7   1330 = AEDD 6
 150 = 9CCE 6   300 = 5E05 0   450 = 2F74 4   600 = 5E05 F   750 =    0 4   900 =  63A D  1050 = 649F C  1200 = 9719 0   1270 = 5E05 F   1340 = 5D4E 6
```

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Climb aboard the carousel

Jonathan Harston presents a program to grab complete teletext page sequences automatically

EVEN though BBC TV no longer transmits telesoftware programs, a teletext adapter isn't completely useless. Lots of pages of information are transmitted by the BBC and ITV services, many being carousels made up from sub-pages.

Usually the sub-page number and the total number of sub-pages is displayed in the top right-hand corner.

This program lets you download one of these carousels, so you can use it in a teletext editor and perhaps include it in your own carousels. Don't forget, though, that most transmitted teletext is copyright.

Type in the listing and ensure you've made no errors using the checksums. When run, the program asks you for the channel, the page number and the filename under which to save the carousel. Once you have entered these details, the program waits for each sub-page of the carousel to be transmitted, and copies it to disc.

As the program is waiting, it shows its progress so far with white blocks indicating the sub-pages not yet captured and green blocks for those saved. The sub-pages don't have to be transmitted in the correct order – the program slots them into the file in the correct place. Once all the sub-pages have been captured the program stops.

How it works

The program first turns the header on, then asks for the channel, page and name to save the pages under. After setting the page and channel, the programs waits for a page to arrive. This is then examined for an index and the total number of sub-pages. Two places are looked at – the top right-hand corner and the bottom right-hand corner. If it can't find an index the program stops.

The program then attempts to save a dummy file long enough for all the pages to check that there's enough disc space. The short piece of machine code that is assembled wipes of the top bit from all the characters on screen, except for the teletext control characters and the #, ` and _ characters.

The file is opened and the captured sub-page is output to it. The program then enters a loop waiting until all the sub-pages have been captured. Within this loop, while waiting the coloured blocks are shown to track progress. Once a sub-page has been captured the program finds the sub-page number and checks if it has already been saved. If not, it saves it.

pf%() holds flags indicating which sub-pages have been saved. If at least one of the entries of *pf%()* is zero there are still more sub-pages to capture, and the loop is repeated. Otherwise the output file is closed and the program ends.

PROCsave() sends the captured sub-page into the file. First, the characters on screen are converted by calling the machine code assembled earlier.

Osgbpb is then used to send 920 bytes from the screen into the file, and then 104 padding bytes after. Using *osgbpb* is much faster and efficient then using multiple BPUTs.

Each sub-page captured is stored as 1024 bytes in the file. The first 920 contain the 23 lines of text, and the final 104 bytes are padding.

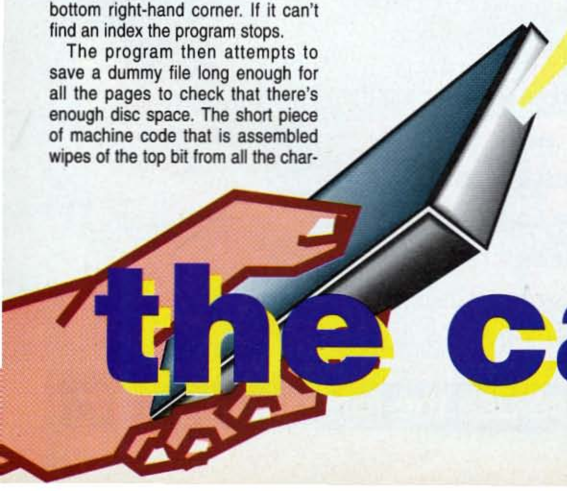
This is the format most commonly used in the teletext editing programs that I have come across, with the padding bytes being used for any extra data specific to the program.

The routines were originally written for use with the Acorn teletext adapter and the ATS rom, but it can be very easily changed for other adapters.

The critical commands are *TRANSFER and *DISPLAY. These wait for the next sub-page of the page set with *PAGE to arrive and then display it on the screen. Any replacement would have to do the same.

```
   10 REM GetPage
   20 REM By Jonathan Harston
   30 REM (c) The Micro User
   40 MODE7
   50 ON ERROR PROCerr
   60 DIM tx% 20
   70 PROC_title
   80 A%=130:IF (USR&FFF4 AND&FFFF00)<>&
FFFF00 PRINT"Program must run in the I/O
 processor.":END
   90 *HON
  100 INPUT"Channel: "C:PROCcli("CH"+STR
$(C))
  110 INPUT"Page: "P:PROCcli("PAGE "+STR
$(P))
  120 INPUT"Save name: "S$
  130 PRINT"Searching for ";P
  140 *TRANSFER 7000
  150 *DISPLAY 7000
  160 add%=&7C4B:REPEAT
  170 M=add%?5:add%?5=13:A$=$add%:add%?5
=M
  180 B$="":FOR A=1 TO LEN A$:B$=B$+CHR$
(ASCMID$(A$,A,1)AND&7F):NEXT
  190 add%=add%+&370
  200 UNTIL INSTR(B$,"/") OR add%>&8000
  210 IF INSTR(B$,"/")=0 PRINTTAB(0,24);
"Can't find page number.";:END
  220 pages%=VAL(MID$(B$,INSTR(B$,"/")+1
)):IF pages%=0 OR pages%>99 PRINTTAB(0,2
4);"Invalid magazine size.";:END
  230 PROCcli("SAVE "+S$+" 0+"+STR$~(pag
es%*1024)+" FFFF7C28 FFFF7C28")
  240 CLS:DIM pf%(pages%),mcode% 60
  250 add%=add%+INSTR(B$,"/")-1:B$=LEFT$
(B$,INSTR(B$,"/")-1)
  260 FOR pass%=0 TO 1
  270 P%=mcode%
  280 [OPT pass%*2
  290 LDA #0:STA &70:TAY
  300 LDA #&7C:STA &71
  310 .loop
  320 LDA (&70),Y:CMP #163:BEQ stay
  330 CMP #223:BEQ stay
  340 CMP #224:BEQ stay
  350 CMP #255:BEQ stay
  360 AND #&7F:CMP #32:BCS stay
  370 ORA #&80
  380 .stay
  390 STA (&70),Y:INY:BNE loop
  400 INC &71:LDA &71:CMP #&80:BNE loop
  410 RTS
  420 ]NEXT
  430 CHN%=OPENOUT(S$):PTR#CHN%=935:BPUT
#CHN%,pages%
  440 IF ASC B$<48 OR ASC B$>57 B$=MID$(
B$,2)
  450 PROCsave(B$)
  460 REPEAT:CLS:REPEAT:REPEAT
  470 PRINT"P";P:PROC_title:FOR L=1 TO p
ages%:IF pf%(L)=1 VDU146 ELSE VDU151
  480 VDU47:IF (L MOD 20)=0 PRINT'
  490 NEXT:VDU31,(2*VAL B$-1)MOD 40,6+2*
(VAL B$-1)DIV20,94,8
  500 PROCcli("PAGE "+STR$(P))
  510 *TRANSFER 7000
  520 *DISPLAY 7000
  530 UNTIL (?add% AND&7F)=ASC"/"
  540 ?add%=13:A$=$(add%-2):?add%=ASC"/"
  550 B$="":FOR A=1 TO LEN A$:B$=B$+CHR$
(ASCMID$(A$,A,1)AND&7F):NEXT
  560 IF ASC B$<48 OR ASC B$>57 B$=MID$(
B$,2)
  570 IF VAL B$>pages% CLS:PRINTTAB(0,20
);"Bad data..."
  580 UNTILVAL B$<=pages%
  590 IF pf%(VAL B$)=0 PROCsave(B$)
  600 f%=0:FOR L=1 TO pages:IF pf%(L)=0
f%=1
  610 NEXT:UNTIL f%=0:CLOSE#CHN%
  620 CLS:PROC_title:PRINT'"Finished"
  630 *HOFF
  640 END
```

➤



➤

```
  650 DEFPROCsave(B$)
  660 PRINTTAB(0,0);P;"/";B$
  670 CALL mcode%
  680 ?tx%=CHN%:tx%!1=&FFFF7C28:tx%!5=92
0:tx%!9=1024*(VAL B$-1)
  690 X%=tx%:Y%=X% DIV 256:A%=1:CALL &FF
D1
  700 FOR A=&7000 TO &7067 STEP4:!A=0:NE
XT:?&700F=pages%
  710 ?tx%=CHN%:tx%!1=&FFFF7000:tx%!5=10
4:tx%!9=1024*(VAL B$-1)+920
  720 CALL &FFD1
  730 pf%(VAL B$)=1:ENDPROC
  740 DEFPROC_title
  750 PRINTTAB(0,1);CHR$132;CHR$157;CHR$
131;CHR$141;SPC(3)"Teletext Page Downloa
der"'CHR$132;CHR$157;CHR$131;CHR$141;SPC
(3)"Teletext Page Downloader"
  760 PRINT" "CHR$157;CHR$132;SPC(6)"(C)
1988 J.G.Harston"''
  770 ENDPROC
  780 DEFPROCerr
  790 PRINTTAB(0,23);:REPORT:ON ERROR RE
PORT:PRINT" at line ";ERL;:END
  800 CLOSE#0:*HOFF
  810 END
  820 DEFPROCcli($&700)LOCALX%,Y%
  830 Y%=7:CALL&FFF7:ENDPROC
```

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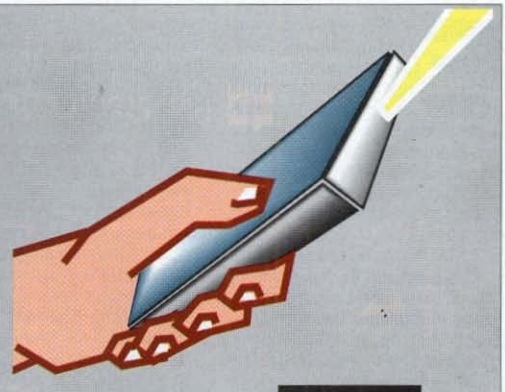

Get it right ✓

```
 10 =    0 0    110 = CEAD D   210 = 18CE 3   310 =  325 0   410 = 9843 0   510 = 79D3 D   610 = F57D 0
 20 =    0 0    120 = 2E85 E   220 = B87F 5   320 = D7CF 5   420 = 5460 7   520 = 2099 3   620 = 3228 3
 30 =    0 0    130 = BBFF 2   230 = DF82 1   330 =  AA1 F   430 = E5D7 C   530 = 6428 0   630 = 1BB1 E
 40 = 8AFC C    140 = 79D3 8   240 = A729 0   340 = 165B 6   440 = 3E5C 5   540 = 60F5 D   640 = FD2E D   710 = E374 7   780 = 24C8 3
 50 = 2D1B 5    150 = 2099 2   250 = 4150 3   350 = 50A3 0   450 = EDD3 4   550 = ABAE 9   650 = 6750 6   720 = 1100 7   790 = 3691 E
 60 = C2FD A    160 = 3E42 D   260 = 38CF B   360 = 3CB6 0   460 = 3DA8 5   560 = 3E5C 8   660 = F3AA 8   730 = 7346 3   800 = 29E6 8
 70 = B245 6    170 = B4D3 3   270 = 20AC 6   370 = 6FA0 8   470 = 42C1 D   570 = C72D 4   670 = 7402 4   740 = D2C4 6   810 = FD2E E
 80 =  916 3    180 = ABAE C   280 = 10C3 C   380 = CDD8 9   480 = A709 2   580 =  CF3 4   680 =  19D 0   750 = 8C2C E   820 = 6188 B
 90 = 5F11 E    190 = 50DA 7   290 = ED65 1   390 = 9202 9   490 = E9C4 6   590 = EED1 0   690 = 9AD4 4   760 = 62F2 6   830 = 50E0 9
100 = F820 4    200 = 96C1 2   300 = B3DE A   400 = 54FC 9   500 = A1B4 9   600 = 8858 1   700 = A5F3 4   770 = ED0F 1
```

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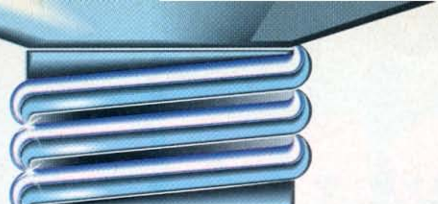


Iconoclastic art

Ken Down explains how to put interesting little pictures on your own programs

DEPENDING on your point of view, Risc OS is one of the best things to have happened to the Archimedes, or it is nothing but a confounded nuisance. Take, for example, the pretty icons which now accompany programs and are displayed whenever you catalogue a disc.

They are beautiful, they are clever, they enable you to identify programs if you are illiterate. They also take forever to load in, so you could catalogue half a dozen normal discs in the time that it takes the computer to find and load all those little pictures.

Still, as I said, they are very pretty, very clever and you may be wondering how you should go about attaching pretty pictures to your own programs.

It's not all that difficult – once you know how – and that's what this article is all about.

Let's go through the steps necessary to produce a pretty picture to go with one of your programs. Nearly everyone who has done any programming has written or typed in a Basic sort program, so why not find your favourite, copy it on to a blank disc and call it "Sort".

The first thing to note is that these icons will only appear for directories and the directory name must begin with "!" – !Edit, !Paint, !Draw and so on.

So as our first step, enter the DeskTop and catalogue the disc by clicking on the disc icon at bottom left.

A window will appear containing a single program, your Basic sort. Move the mouse pointer into this window and click the Menu – the middle – button on the mouse.

Move the pointer down the list of options until you find the one labelled *New directory* with an arrow beside it. When the pointer touches this arrow another window appears together with a red caret or cursor. Type the word *!Sort* into this window and press Return.

You now have two files displayed in the disc catalogue window – Sort, your Basic sort program and !Sort which is a directory. Because it begins with the "!" character the computer recognises that this is not a common directory but is in fact an application.

The computer acknowledges this fact by displaying a special icon – the Archimedes symbol and the letters *APP*. If you now double-click on this application icon the DeskTop displays an error message, saying that the file !Sort.!Run has not been found.

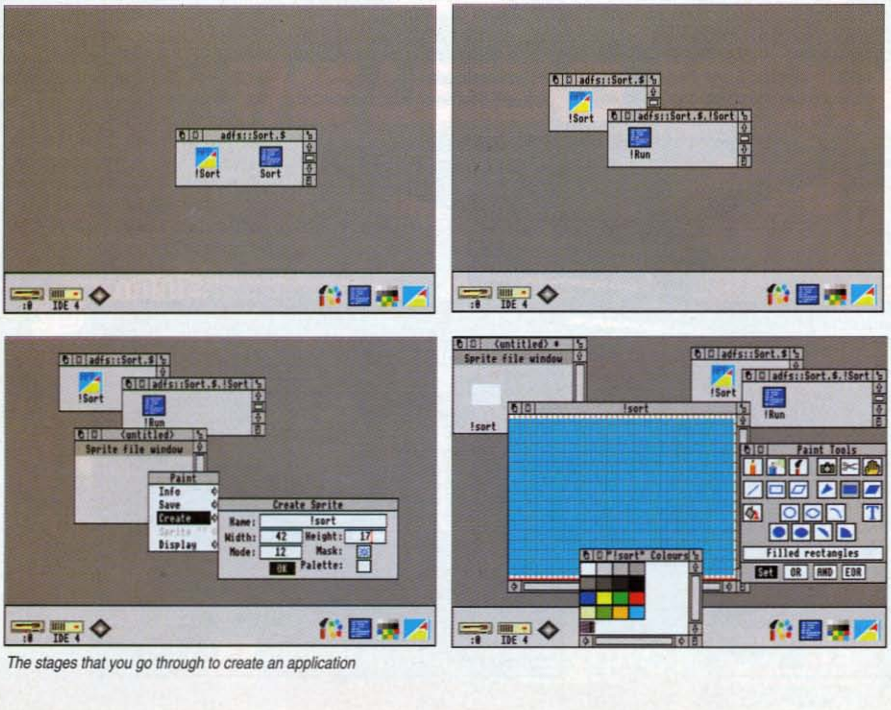
Whenever an application is selected in this way, the computer automatically looks inside the directory for a file called !Run, which, of course, you don't have yet. Let's give it something to find.

Click the cancel button in the error panel. Now hold down the Shift key and again double-click on the application icon. This opens up the directory so you can see what is inside it – at this stage, nothing.

Hold down Shift again and drag the icon representing your Sort program into the !Sort directory window. This moves the program from the root directory into the application directory. If you didn't hold down Shift the program would be copied, not moved. Use the mouse and menus to rename the program to *!Run*.

Remove all the windows from the screen and again click on the disc icon at bottom left. A window appears containing a single icon – !Sort. Inside this application is a single program, your Basic sort program, which has been renamed to !Run.

Double-click on the !Sort icon and at once the computer springs into life and your sort program begins to execute, sorting 10,000 integers in half a second, or putting your telephone book into alphabetical order or whatever you have programmed it to do.



Name: !sort
Width: 42 Height: 17
Mode: 12

The stages that you go through to create an application

Please note that what you have done does not make this a multi-tasking application. It behaves exactly as it did before, taking over the whole of the computer's attention. The only difference is that you now click on a directory instead of a program.

Press Escape and get back to the DeskTop. Put the disc of Risc OS utilities that came with your computer into the drive or into drive one if you have two, catalogue it – see what I mean about it taking a long time – and double-click on the !Paint application.

More whirring takes place and then

➤

➤

the !Paint icon appears on the icon bar. You are ready to begin.

Click once on the !Paint icon on the icon bar with the Select – left hand – button of the mouse and a single blank window appears on the screen. Click the Menu button inside it and select the Create option. A dialogue panel appears called Create Sprite.

The first thing to do, obviously, is give the sprite which you are about to design a name, and this must be the same as the name of your application, in this case !Sort.

Press Return and the caret moves down to the next dialogue box which asks Width? The default value is 100, but sprites which are to appear on the icon bar should not be any wider than about 42, so delete the 100 and type in 42.

Press Return again and set the height to be 17. There is no reason in the world why you should not design a positively huge sprite for your program, but if it is too big it may well cover up other parts of the disc catalogue and – when you come to writing proper applications – obscure other icons on the icon bar.

Don't press Return this time, as we are quite happy with Mode 12. Instead move the pointer to the box labelled Mask and click inside it, which causes a blue star to appear.

We will be using the DeskTop palette so ignore the Palette box and click the OK button. A white square labelled with the name of your sprite appears in the !Paint window.

Move the pointer over to this square and double-click on it, which causes a new window to appear.

At this point I should explain something about !Paint. The first window which contains the white square and the sprite name is known as a sprite file window. The second window is the sprite window.

You see, a sprite file can contain more than one sprite, but you usually only work on them one at a time, so each sprite has its own window.

It is for this reason that there are two separate Save options: One saves the whole sprite file and the other saves a single sprite.

Now you have to decide what icon would best represent your program. Acorn have some guidelines on this. Most importantly they suggest that your choice should **not** be based on an English language pun – for example, don't use a picture of Noah's Ark for an *Arc*hive file. The reason is quite clear: Non-English speakers won't understand.

What sort of icon would best represent a sorting program? How about something simple like *A* and *Z* with an arrow pointing from one to the other? Let's try that anyway and you can get more dramatic and flashy later on your own.

Click the Menu button inside the sprite window – not the sprite file window – and move down to the Paint option. At the moment we are only interested in two of the sub-options: Show colours and Show tools.

Click on the first with the Adjust – right hand – button so as to keep the menu on the screen then click on the second with the Select button, which gets rid of the menu.

There are now about six different windows on the screen, most of them on top of each other and generally getting in each other's way. Shuffle them around until they are tidily arranged and you can get at everything.

From the colours window select a colour – say red – and then from the tools window select the overturned tin of paint. Move the pointer to the bottom left of the sprite window and click. At once a red square appears. It doesn't fill the sprite window but that is the full size of your sprite – !Paint can't make windows any smaller.

Presumably you want your sprite to appear as the letters A-Z on the window background rather than inside a white or red square. One way to get this is to chose colour 1, a sort of light gray, and fill the square with it. The other, and probably better, way is to use a mask.

Down the bottom of your palette is a seventeenth colour, a sort of stripy affair. This is the mask colour and unfortunately !Paint does not allow you to perform a *local fill* with the mask colour.

If you are going to use the mask you will have to select the mask *colour* and then select the solid rectangle from the tools window. Draw a rectangle that completely covers your sprite.

In either case you will see the white or red square in the sprite file window disappear as it merges with the background colour of the window itself.

Now use the various tools available to you to draw your pretty picture. Line rubberbanding is probably the best one for the letters, and you may find it helpful to enlarge the picture with the zoom option.

When you have finished go back to the sprite file window and click the Menu button. Select the Save option. The default name is SpriteFile, but you should delete this – Control+U – and instead call the file !Sprites, then drag the save box over into the window of your !Sort application.

You will doubtless be disappointed to see that nothing has happened. Your !Sort application still has the Archimedes symbol. Remove the disc window from the screen and re-catalogue that disc. Eureka! Your !Sort directory now appears with its own pretty picture.

We aren't finished yet, however. Click the menu button inside your disc catalogue window and select the Display option. From this select the sub-option Small icons.

At once the display inside your catalogue window changes and the computer automatically scales down all the icons.

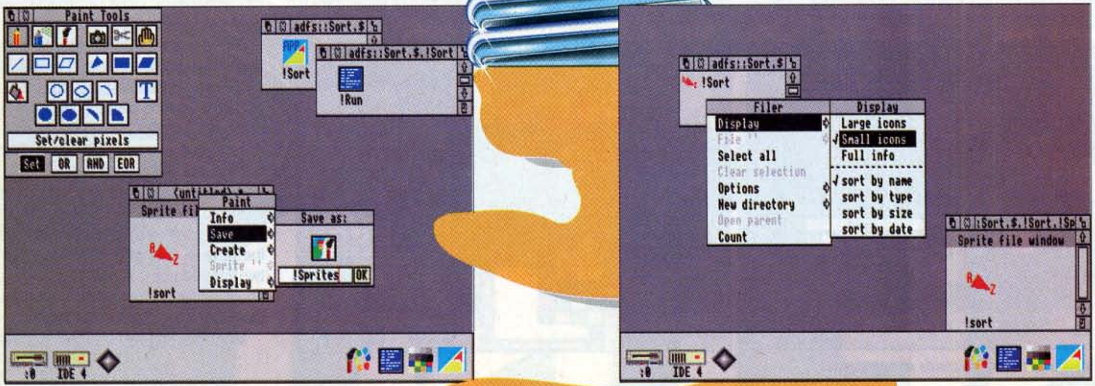
Unfortunately, while some of the icons look all right when they are scaled down, others are not so good. If yours is at all spindly it may well be that bits of it are missing. That is why the Archimedes allows you the option of designing your own small icon.

For this you need to go back to your sprite file window, click menu and create a sprite called *sm!Sort* which should be 19 pixels wide and 9 high. You may have to drag your sprite file window slightly larger to see the little white square that represents your small icon.

Follow exactly the same steps as before to create your small icon. Of course there is no reason why the small icon should be the same as the big icon. It can be quite different in appearance, even though that would not be a terribly logical thing to do.

When you have finished make sure that you save the whole sprite file, not the single sprite, and use the same name: !Sprites. Now you should have both large and small displays exactly as you want them.

● *In another article in this series I will tell you what your !Run file should really be, and why you should use a !RunImage. In the meantime you can go mad designing new sprites or adapting old ones to illustrate all your favourite programs. Have fun!*



The final steps using !Paint

Teletext Screen Editor

Barry Lapthorn introduces a new way of using graphics in Mode 7

MOST of the many art packages available for the BBC Micro over the years have worked in Modes 0,1 and 2. While they allow complex functions such as circle drawing and rubberbanding, these facilities have been largely ignored in other modes, specifically Mode 7 – the teletext mode.

When the BBC Micro was designed, Acorn managed to produce Mode 7 in such a way that the screen memory only required 1024 bytes, thus leaving a large amount of memory to work with. As a result graphics resolution was lost to a large degree, although not entirely.

In the graphics modes of the BBC Micro commands such as :

```
PLOT 69,X,Y
```

would plot a point in the currently selected colour at position (X,Y) on a screen of, theoretically, 1280 by 1024 points.

Clever text

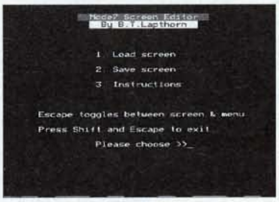
The italics text routine works by transfering a character into the location *c%* and then using osword 10 to get its definition, as used in other modes.

Then it invokes the machine code ASL – Arithmetic Shift Left – to tilt the character, using the bottom two rows if it is lower case or the bottom four for lower case letters. This new character is then printed to the screen pixel by pixel.

The large text routine works along the same method, but instead of tilting the letters it stretches them downwards.

Up till now it has not been possible to use such a command directly in Mode 7 – but now this program attempts to remedy this situation.

By using an osbyte call with the accumulator set to 135, it is possible to read the Ascii value of the character at the current cursor position. If the value is 160 or over in Mode 7 it is a graphics character. To find which one it is use the adjoining grid.



```
Mode7 Screen Editor
By B.T.Lapthorn

1  Load screen
2  Save screen
3  Instructions

Escape toggles between screen & menu
Press Shift and Escape to exit
Please choose >>_
```

For example, to plot a complete block on screen the value would be 1 + 2 + 4 + 8 + 16 + 64 + 160 = 255 = &FF

But conversely, when plotting a single point on the screen in Mode 7, it is necessary to know the values of the surrounding six blocks as in the above grid.

If you wish to plot a point using the grid at point B2, all we have to do is read the value, say 160, and then OR it with 8 and finally write the character back to the screen.

This is the way PROCplot(X,Y,plot type) operates. In Mode 7 the screen is limited to 80 by 75 pixels in the X and Y directions respectively.

If the origin is to be at the bottom left hand corner, as in normal graphics modes, the Y direction has to be reversed. So if a point is to be plotted at 45,45 the X co-ordinate is unchanged but the real Y co-ordinate is 75 - 45 = 30

Cursor keys	Move the cursor about, holding down Shift moves it faster.
Spacebar	Plots a single point. Once pressed the position of the cursor is remembered for future reference.
U	Wipes a single point. The cursor's position is also noted here for reference.
Return	Notes the cursor's current position.
C	Draws a circle with radius from last noted point to current cursor position.
R	Draws a rectangle from last noted point to cursor.
L	Draws a line from cursor to last noted point.
K	Changes colour, one character to the left.
T	Allows text to be written to the screen.
G	Basic graph plotter. Origin is the centre of the screen, X and Y ranges are about -37 to 37
I	Inserts a graphics code one character to the left of the cursor, for example CHR$(141).
E	Colours the left hand edge of the screen one colour, others may be added using *K* or *I*.
S	Clears the whole screen.

Once the real co-ordinates are known the text cursor position is needed so that character values can be read. These are obtained by:

```
X  position = X co-ordinate DIV 2
Y  position = REAL Y co-ordinate
DIV 3
```

The program works like this: When run it pauses for a moment to clear some memory. Once running you press Escape to get in to the edit mode, Shift+Escape to exit, or select any of the menu options. The keys active in edit mode are listed in the panel.

The program is very easy to use and improve on. One addition could be a fill routine, also the ability to change the shape of the cursor would be useful.

Main routines

plot(X,Y,plot type) Plots a point at (X,Y)

np(BX,BY) Function that returns TRUE if a point is not present in the current character otherwise it's FALSE.

readchar(X,Y) Function that returns the ascii value of the character at (X,Y) on the screen.

swapStores Retrieves the current screen being edited. The screen is stored at &7C00 and &7000.

doactions Controls user inputs and acts on them in edit mode.

Main Variables

actx%, acty% These contain the current position of the text cursor. They are re-calculated everytime you press a key in PROCdoactions

ch%(2,3) Contains the values corresponding to the grid for calculating ascii values.

sx%, sy% Contain the X and Y co-ordinates the last time the space bar or Return were pressed.

oldx, oldy Contain the current X and Y co-ordinates of the graphics cursor.

```
10 REM Teletext screen designer v.1
   20 REM By Barry T. Lapthorn
   30 REM (c) The Micro User
   40 :
   50 MODE7
   60 PRINT'''"Please wait ...";:Z%=&2020
2020:FORloop%=0TO&400:loop%!&7000=Z%:NEX
T:CLS
   70 ON ERROR GOTO 2160
   80 PROCcursor(0)
   90 PROCinit
  100 REPEAT
  110 PROCmenu
  120 UNTILO
  130 END
  140  :
  150 DEFPROCinit
  160 CX=1:CY=0
  170 DIM ch%(2,3)
  180 readchar%=&900
  190 FORi%=0TO2STEP2:P%=readchar%:[OPTi
%:LDA#31:JSR&FFEE:LDA&71:JSR&FFEE:LDA&72
:JSR&FFEE:LDA#135:JSR&FFF4:STX&76:RTS:]:
NEXT
  200 RESTORE:FORout=1TO3:FORin=1TO2:REA
Dch%(in,out):NEXT in:NEXT out
  210 ENDPROC
  220 :
```

➤

```
  230 DEFPROCplot(X,Y,plt%):X=INTX:Y=INT
Y
  240 REM plt%=1 'PLOT 69,X,Y'
  250 REM plt%=2  'unplot point'
  260 REM plt%=3  'invert point'
  270 IF (X>79 ORX<2 ORY>72 ORY<2) ENDPR
OC
  280 ax%=X DIV 2:BX=(X MOD 2)+1:Y=72-Y:
ay%=Y DIV 3:BY=(Y MOD3)+1
  290 chr%=FNreadchar(ax%,ay%,0)
  300 np=FNnp(BX,BY,chr%)
  310 IF np ANDplt%=1 chr%=chr%+ch%(BX,B
Y)
  320 IF (NOT np) ANDplt%=2 chr%=chr%-ch
%(BX,BY)
  330 IF np ANDplt%=3 chr%=chr%+ch%(BX,B
Y)
  340 IF (NOT np) ANDplt%=3 chr%=chr%-ch
%(BX,BY)
  350 PRINTTAB(ax%,ay%);CHR$chr%;TAB(CX,
CY);
  360 ENDPROC
  370 :
  380 DATA 1,2,4,8,16,64
  390 :
  400 DEFFNreadchar(XX,YY,out%):?&71=XX:
?&72=YY:CALL readchar%:IF out%=0 AND?&76
<160 =160 ELSE =?&76
  410 :
  420 DEFFNnp(BX,BY,chr%):=((chr%-160) O
R(ch%(BX,BY)))<>(chr%-160) ANDchr%>159
  430 :
  440 DEFFNin(c%,prot%):PRINT"=";:w$="":
REPEATREPEAT:a%=GET:UNTIL((a%>31 ANDa%<1
28) ORa%=13):IF a%=13 ORa%=127 ELSE IF L
ENw$=c% ELSE w$=w$+CHR$a%:VDUa%
  450 IF a%=127 IF w$>"" w$=LEFT$(w$,LEN
w$-1):VDU127
  460 UNTILa%=13:IF prot% PRINT:=w$ ELSE
 =w$
  470 :
  480 DEFFNgetkey(val$):REPEAT:K$=GET$:I
F ASCK$>32 ANDASCK$<42 K$=CHR$(ASCK$+16)
 ELSE IF ASCK$>96 ANDASCK$<123 K$=CHR$(A
SCK$-32)
  490 UNTILINSTR(val$,K$)>0:=K$
  500 :
  510 DEFPROCcursor(C%):VDU23,1,ABSC%;0;
0;0;:ENDPROC
  520 :
  530 DEFPROCcentre(t$,b%,f%):s%=18-LENt
$/2:PRINTSPC(s%);CHR$b%;CHR$157;CHR$f%;t
$;"  ";CHR$156:ENDPROC
  540 :
  550 DEFPROCgraph
  560 PRINTTAB(0,24);
  570 PROCcursor(1):PRINT"Y";:fn$=FNin(3
0,0):PROCcursor(0):PROCblank
  580 IF fn$="" ENDPROC
  590 FORX=37TO-37STEP-0.1
  600 XX=X
  610 YY=EVALfn$
  620 PROCplot(X+37,YY+33,1)
  630 X=XX
  640 NEXT
  650 ENDPROC
  660 :
  670 DEFPROCcircle(cx,cy,rx,ry,step)
  680 FORloop=0TO(PI/2) STEP step
  690 XX=rx*SINloop
  700 YY=ry*COSloop
  710 PROCplot(cx-XX,cy-YY,1)
  720 PROCplot(cx+XX,cy-YY,1)
  730 PROCplot(cx-XX,cy+YY,1)
  740 PROCplot(cx+XX,cy+YY,1)
  750 NEXT
  760 ENDPROC
  770 :
  780 DEFPROCmenu
  790 VDU26,12:PRINT'
  800 PROCcentre("Mode7 Screen Editor",1
29,131)
  810 PROCcentre("By B.T.Lapthorn",135,1
32)
  820 spc%=12:PRINT'
  830 PRINT'SPC(spc%);"1. Load screen"
  840 PRINT'SPC(spc%);"2. Save screen"
  850 PRINT'SPC(spc%);"3. Instructions"
  860 PROCcursor(1)
  870 PRINT''';"  Escape toggles between
 screen & menu"
  880 PRINT';"  Press Shift and Escape t
o exit."
  890 PRINT'SPC(spc%);"Please choose >>"
;:choice$=FNgetkey("123")
  900 IF choice$="1" PROCload
  910 IF choice$="2" PROCsave
  920 IF choice$="3" PROCinstr
  930 ENDPROC
  940 :
  950 DEFPROCdoactions
  960 CX=1:CY=0:PRINTTAB(CX,CY);
  970 PROCcursor(0)
  980 oldx=40:oldy=35
  990 sx%=oldx:sy%=oldy
 1000 *FX4,2
 1010 REPEAT
 1020 actx%=oldx DIV 2:acty%=(72-oldy)DI
V 3
 1030 char%=FNreadchar(actx%,acty%,1):al
tered%=0
 1040 PROCplot(oldx,oldy,3):on%=1
 1050 PROCplot(oldx,oldy,3):on%=0
 1060 IF INKEY(-1) inc%=4 ELSE inc%=1
 1070 IF INKEY(-26) ANDoldx>(1+inc%) old
x=oldx-inc%
 1080 IF INKEY(-122) ANDoldx<(80-inc%) o
ldx=oldx+inc%
 1090 IF INKEY(-58) ANDoldy<(72-inc%) ol
dy=oldy+inc%
 1100 IF INKEY(-42) ANDoldy>(1+inc%) old
y=oldy-inc%
 1110 IF INKEY(-54) PROCplot(oldx,oldy,2
):sx%=oldx:sy%=oldy:altered%=1
 1120 IF INKEY(-99) PROCplot(oldx,oldy,1
):sx%=oldx:sy%=oldy:altered%=1
 1130 IF INKEY(-83) PROCcheckcircle(oldx
,sx%,oldy,sy%)
 1140 IF INKEY(-87) PROCline(oldx,oldy,s
x%,sy%):altered%=1
 1150 IF INKEY(-52) PROCrect(oldx,oldy,s
x%,sy%):altered%=1
 1160 If INKEY(-82) CLS
 1170 IF INKEY(-74) sx%=oldx:sy%=oldy
 1180 IF INKEY(-71) PROCcolour
 1190 IF INKEY(-35) PROCedge
 1200 IF INKEY(-36) PROCtext:char%=FNrea
dchar(actx%,acty%,1)
 1210 IF INKEY(-84) PROCgraph
 1220 IF INKEY(-38) PROCgcode:char%=FNre
adchar(actx%,acty%,1)
 1230 IF altered%=0 PRINTTAB(actx%,acty%
);CHR$char%;
 1240 UNTIL0
 1250 ENDPROC
 1260 :
 1270 DEFPROCcheckcircle(oldx,sx%,oldy,s
y%)
 1280 IF oldx-sx%=0 ANDoldy-sy%=0 ENDPRO
C
 1290 radius=SQR((oldx-sx%)^2+(oldy-sy%)
^2)
 1300 PROCcircle(sx%,sy%,radius,radius,1
/radius)
 1310 altered%=1
 1320 ENDPROC
 1330 :
 1340 DEFPROCline(stx%,sty%,endx%,endy%)
 1350 IF endx%<stx% tempx%=endx%:endx%=s
tx%:stx%=tempx%:tempy%=endy%:endy%=sty%:
sty%=tempy%
 1360 IF endx%=stx% PROCxline(stx%,sty%,
endy%):ENDPROC
 1370 grad=(endy%-sty%)/(endx%-stx%)
 1380 IF ABSgrad>1 step=1/ABSgrad ELSE s
tep=1
 1390 FORloop=stx% TO endx% STEP step
 1400 newy=grad* (loop-stx%)
 1410 PROCplot(loop,newy+sty%,1)
 1420 NEXT loop
 1430 ENDPROC
 1440 :
 1450 DEFPROCxline(sx%,sy%,ey%)
 1460 IF sy%>ey% st=-1 ELSE st=1
 1470 FORloop=sy%TOey% STEP st
 1480 PROCplot(sx%,loop,1)
 1490 NEXT
 1500 ENDPROC
 1510 :
 1520 DEFPROCrect(bx,by,tx,ty)
 1530 PROCline(bx,by,bx,ty)
 1540 PROCline(tx,ty,bx,ty)
 1550 PROCline(tx,by,tx,ty)
 1560 PROCline(tx,by,bx,by)
 1570 ENDPROC
 1580 :
 1590 DEFPROCedge
 1600 PRINTTAB(0,24);"Which edge colour
(1-7) >>";:PROCcursor(1):col%=VALFNgetke
y("1234567"+CHR$13):IF col%=0 PROCblank:
PROCcursor(0):ENDPROC
 1610 PROCblank:FORloop%=0TO23:PRINTTAB(
0,loop%);CHR$(144+col%);:NEXT:PROCcursor
```

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```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 8AFC 8
  60 = 598D C
  70 = CE29 4
  80 = EB93 B
  90 = DEBB D
 100 = BFBA 2
 110 = 6D0D D
 120 = 53CE D
 130 = FD2E E
 140 = 9719 E
 150 = 344C 4
 160 = 444D C
 170 = 52F1 C
 180 = 981D 0
 190 = C6EC 6
 200 = 7310 8
 210 = ED0F 7
 220 = 9719 7
 230 = 7DC0 5
 240 =    0 5
 250 =    0 5
 260 =    0 5
 270 = 10CC 8
 280 = 2EEE 7
 290 = 9201 F
 300 = E4C9 E
 310 = F82F 7
 320 = 560C 8
 330 = 239F 8
 340 = 3BD4 1
 350 = 5BEC D
 360 = ED0F 9
 370 = 9719 3
 380 = E738 7
 390 = 9719 9
 400 = 95BB 4
 410 = 9719 F
 420 = 75D8 D
 430 = 9719 7
 440 = EFD5 5
 450 = EC1B F
 460 = B597 8
 470 = 9719 B
 480 = 91AF 3
 490 = 1FB6 A
 500 = 9719 C
 510 =  C5A 6
 520 = 9719 2
 530 = 567B 6
 540 = 9719 8
 550 = 2921 E
 560 = 1D58 C
 570 = D4BB F
 580 = 5F90 8
 590 = 903C 5
 600 = AFA3 4
 610 = 5BC7 A
 620 = E787 B
 630 = 2BE7 6
 640 = 2C83 5
 650 = ED0F F
 660 = 9719 4
 670 = 3ABB A
 680 = 24AF 7
 690 = E7AC 1
 700 = 2FDD E
 710 =   13 2
 720 =  B2D D
 730 = 8DF2 7
 740 = 86CC 2
 750 = 2C83 F
 760 = ED0F F
 770 = 9719 0
 780 = 87FA C
 790 = C1D5 C
 800 = 7B05 C
 810 = 8793 C
 820 = E7E9 A
 830 = A4DD A
 840 = 537E 0
 850 = 57E0 3
 860 = D8A2 3
 870 = 1DEE 6
 880 = 3CDA 9
 890 =  AB6 5
 900 = D2F5 5
 910 = 440D 9
 920 = FD1E 4
 930 = ED0F 6
 940 = 9719 F
 950 = 1360 9
 960 = 8156 C
 970 = EB93 9
 980 = AFA3 2
 990 = E8BE 6
1000 = D3E0 F
1010 = BFBA B
1020 = BFF3 9
1030 = 92F1 1
1040 = B561 D
1050 = A540 C
1060 = 3ED3 1
1070 = EE0E 6
1080 = 3720 D
1090 = 1D2B F
1100 = 5FC1 B
1110 = B187 8
1120 = F9F4 5
1130 = 7690 9
1140 = 147E 3
1150 = 531B 4
1160 = 3FF2 C
1170 = 4F81 2
1180 =  B82 B
1190 = 1ADC B
1200 = 29B3 4
1210 = A4E9 9
1220 = 1746 6
1230 = 830E 5
1240 = 53CE 9
1250 = ED0F 6
1260 = 9719 9
1270 = 9901 8
1280 = 357D C
1290 = 3CF4 A
1300 = 9841 6
1310 = 4342 F
1320 = ED0F 9
1330 = 9719 4
1340 = 8CF8 6
1350 = FA15 F
1360 = C138 3
1370 = 73B2 7
1380 = 1CC5 2
1390 =   A9 9
1400 = BEC5 9
1410 = ED47 B
1420 =  9F6 3
1430 = ED0F 3
1440 = 9719 5
1450 = 5F96 5
1460 = 411E 3
1470 = 42EF E
1480 = 8C9C D
1490 = 2C83 D
1500 = ED0F E
1510 = 9719 0
1520 = 560B 0
1530 = 6127 8
1540 = 543F 1
1550 = CA2C 4
1560 = AC8A 0
1570 = ED0F E
1580 = 9719 E
1590 = 9DA0 9
1600 = 6BF9 E
1610 = EB66 B
1620 = ED0F 2
1630 = 9719 C
1640 = CAE4 A
1650 = EC2F 7
1660 = 29FC 0
1670 =  8F0 6
1680 =   5B 3
1690 = 9FB5 6
1700 = 320C 1
1710 = EB93 2
1720 = ED0F C
1730 = 9719 2
1740 = A394 B
1750 = 760C 7
1760 = ED0F 5
1770 = 9719 4
1780 = D6DE 8
1790 = 7400 D
1800 =  8F0 D
1810 = C42E A
1820 =   5B 7
1830 = 71EE 0
1840 = EB93 C
1850 = ED0F D
1860 = 9719 A
1870 = 4129 D
1880 = 26F7 A
1890 = CBB2 8
1900 = DF30 F
1910 = ED0F 3
1920 = 9719 2
1930 = 24A1 C
1940 = D759 5
1950 =  88B 6
1960 = EEBE 4
1970 = ED0F 1
1980 = 9719 4
1990 = 7A2C 2
2000 = 265D C
2010 = FB16 0
2020 = B7EB 9
2030 = ED0F F
2040 = 9719 B
2050 = 8EF1 C
2060 = 3B70 3
2070 = D8A2 5
2080 = 2419 9
2090 = 4C8A 1
2100 = 792E 6
2110 = 2C83 3
2120 = EB93 E
2130 = BEE0 A
2140 = ED0F 4
2150 = 9719 0
2160 =  28C F
2170 = 305C 3
2180 = D163 D
2190 = 8B19 B
2200 = FD2E 0
2210 = 9719 9
2220 = B700 D
2230 = 1911 1
2240 = F016 9
2250 = A2C1 7
2260 = CF04 6
2270 = B836 7
2280 = 9D1B 3
2290 = 6FF2 1
2300 = 576F F
2310 = DCC5 B
2320 = 6665 F
2330 = 6D04 8
2340 = 2093 7
2350 = 1827 2
2360 =  E54 2
2370 = ED0F E
2380 = 9719 F
2390 = 8AB8 3
2400 = BF56 1
2410 = ED0F 7
2420 = 9719 E
2430 =  21E B
2440 = C252 6
2450 = C873 F
2460 = ED0F 4
```

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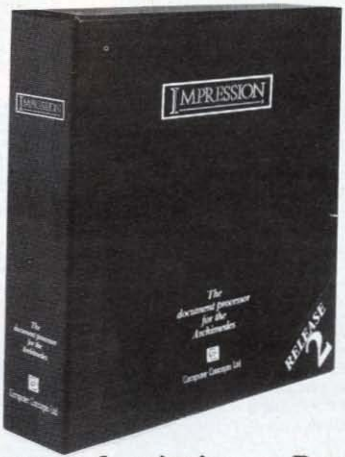

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```
(0):PROCblank
 1620 ENDPROC
 1630 :
 1640 DEFPROCcolour
 1650 PRINTTAB(0,24);"Which colour (1-7)
 >>";:PROCcursor(1):col%=VALFNgetkey("12
34567"+CHR$13):IF col%=0 PROCblank:PROCc
ursor(0):ENDPROC
 1660 PRINT;col%;:wait=INKEY(50)
 1670 PROCblank
 1680 ax%=oldx DIV 2:ay%=(72-oldy)DIV 3
 1690 IF ax%<1 ENDPROC
 1700 PRINTTAB(ax%-1,ay%);CHR$(144+col%)
;
 1710 PROCcursor(0)
 1720 ENDPROC
 1730 :
 1740 DEFPROCblank
 1750 PRINTTAB(0,24);STRING$(38," ");
 1760 ENDPROC
 1770 :
 1780 DEFPROCtext
 1790 PRINTTAB(0,24);"Text ";:PROCcursor
(1):text$=FNin(20,0):wait=INKEY(50)
 1800 PROCblank
 1810 IF text$="" PROCcursor(0):ENDPROC
 1820 ax%=oldx DIV 2:ay%=(72-oldy)DIV 3
 1830 PRINTTAB(ax%,ay%);LEFT$(text$,(39-
ax%));
 1840 PROCcursor(0)
 1850 ENDPROC
 1860 :
 1870 DEFPROCgcode
 1880 PRINTTAB(0,24);"Enter graphics cod
e";:PROCcursor(1):code%=VALFNin(3,0):IF
code%<129 ORcode%>159 PROCcursor(0):PROC
blank:ENDPROC
 1890 wait%=INKEY(50):PROCcursor(0):PROC
blank
 1900 PRINTTAB(actx%,acty%);CHR$code%;
 1910 ENDPROC
 1920 :
 1930 DEFPROCload
 1940 CLS:PROCcursor(1):PRINT''"Title of
 file to load ";:load$=FNin(15,1):PROCcu
rsor(0)
 1950 IF load$="" ENDPROC
 1960 PROCoscli("LOAD "+load$+" 7000")
 1970 ENDPROC
 1980 :
 1990 DEFPROCsave
 2000 CLS:PROCcursor(1):PRINT''"Title of
 file to save ";:save$=FNin(15,1):PROCcu
rsor(0)
 2010 IF save$="" ENDPROC
 2020 PROCoscli("SAVE "+save$+" 7000 740
0 8000 7C00")
 2030 ENDPROC
 2040 :
 2050 DEFPROCswap(swap%)
 2060 *FX14,6
 2070 PROCcursor(1)
 2080 FOR loop%=0TO&400 STEP4
 2090 IF swap% oldmem%=&7000:newmem%=&7C
00 ELSE oldmem%=&7C00:newmem%=&7000
 2100 newmem%!loop%=oldmem%!loop%
 2110 NEXT
 2120 PROCcursor(0)
 2130 *FX13,6
 2140 ENDPROC
 2150 :
 2160 IF INKEY(-1) ORERR<>17 PROCoscli("
FX4,0"):REPORT:PRINT" at line ";ERL:END
 2170 swap=NOT swap
 2180 IF swap CLS:PROCswap(1):PROCdoacti
ons
 2190 IF NOT swap PROCgotomenu
 2200 END
 2210 :
 2220 DEFPROCinstr:CLS:PROCcentre("Instr
uctions",135,130)
 2230 PRINT''"Use cursor keys to move ab
out"'"the screen"
 2240 PRINT"<SPACE> .. plots a point"
 2250 PRINT"<C>     .. plots a circle"
 2260 PRINT"<R>     .. plots a rectangle
"
 2270 PRINT"<L>     .. draws a line"
 2280 PRINT"<K>     .. changes a colour"
 2290 PRINT"<T>     .. to print text"
 2300 PRINT"<G>     .. to plot a graph"
 2310 PRINT"<I>     .. insert a graphics
 code"
 2320 PRINT"<E>     .. colours edge of s
creen"
 2330 PRINT"<S>     .. screen clear"
 2340 PRINT"<RETURN> . marks point for c
ircles etc."
 2350 PRINT"<SHIFT> .. with cursor keys
moves faster"
 2360 PRINT'"Press <SPACE> to continue .
..";:a$=FNgetkey(" ")
 2370 ENDPROC
 2380 :
 2390 DEFPROCoscli($&700)
 2400 LOCALX%,Y%:X%=0:Y%=7:CALL&FFF7
 2410 ENDPROC
 2420 :
 2430 DEFPROCgotomenu
 2440 PRINTTAB(actx%,acty%);CHR$char%;
 2450 PROCswap(0):CLS:REPEAT:PROCmenu:UN
TIL0
 2460 ENDPROC
```

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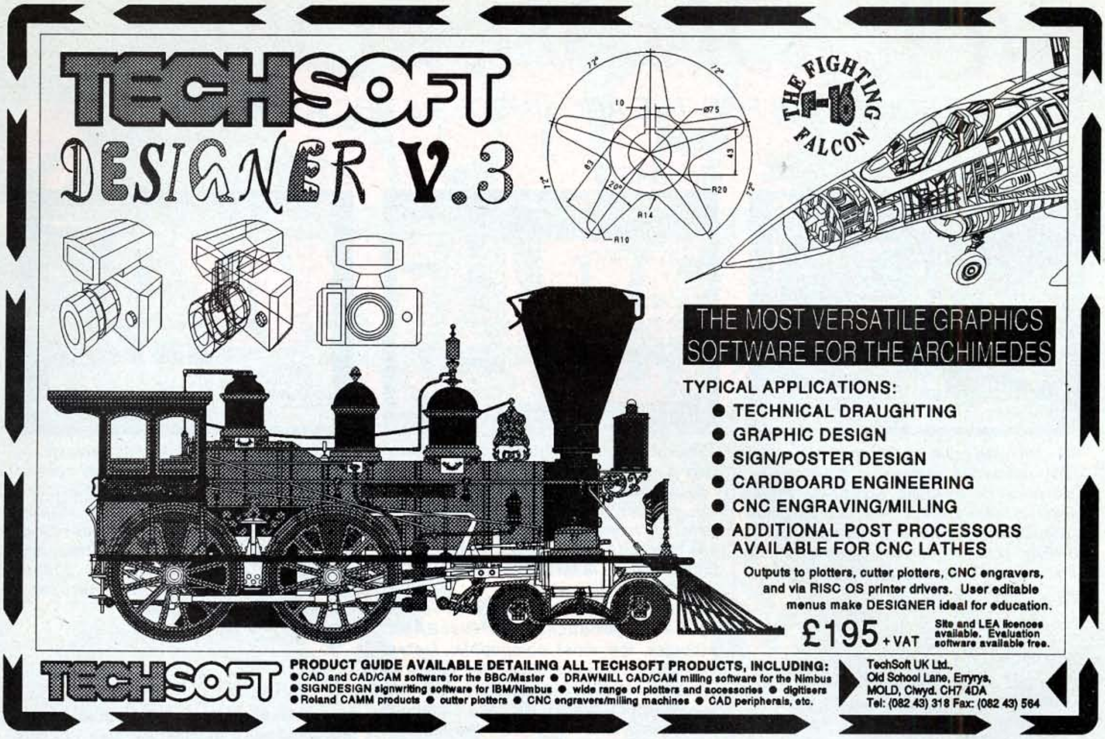

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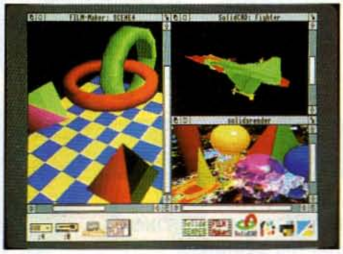

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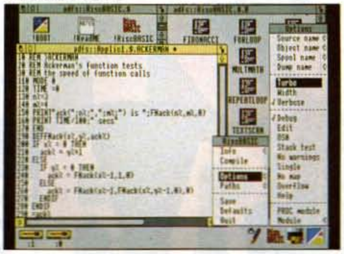

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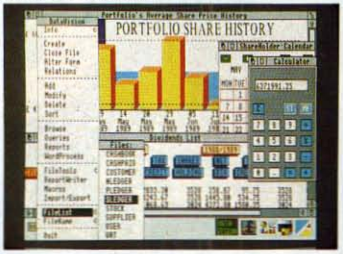

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Writing has never been easier

Paul Hendy tries a word processor that lives up to its promises

EASIWRITER claims to be a full featured, multi-column word processor, setting new standards in ease of use and quality of output. With such products as Impression already on the Archimedes market establishing very high standards, how well does this program compete?

The review copy was supplied without an installation section to the manual – it is promised for the release version – but in fact installation on the hard disc was simply a matter of transferring files into a directory and combining the system files. Within five minutes of receiving the package it was up and running.

Clicking on the Easiwriter icon allows you to open several documents at the same time – though I wonder how many people ever have more than two documents open at the same time.

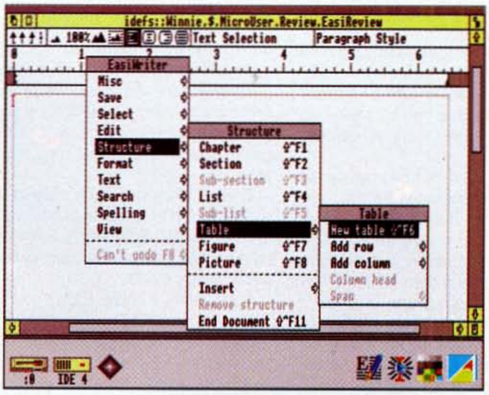
The tutorial section of the manual is well written and guides you through the concepts, but I did get a bit lost between sections, section styles, section headings and section bodies. Perhaps a bit more explanation before being shown how to use them would be useful.

Once you click in the empty editing window the title bar changes colour and you are ready to start producing your document. The top of the window displays a ruler which, though defaulting to inches, can be set in a variety of measurements including centimetres, picas and points.

The rulers and column guides can be hidden to allow more text to be displayed on the screen if required and the entire document can be scaled in terms of percentage to either examine part of the document in greater detail or to gain a better overview of several pages at the same time.

This zooming can be controlled either from the menu system or by using one of the icons above the ruler.

All the normal editing controls are present, including block copy, paste, delete as well as bold, italic and underline. Icons at the top of the screen allow you to insert tab markers, alter the left, paragraph and right margins, and to affect the alignment of text, left, centre, right or full justification. This is the easiest method I have seen in any word processor and is the preferred system on the Apple Mac.



The table option is amazing

You can select, for example, *centre* and everything typed in from that point will be centred. Alternatively you can mark a block of text and then select *centre* to only affect a particular section.

To be able to see the current settings at all times is a real boon. However one minor criticism is that though the ruler and alignment changes are easy to make as you are typing, there is no indication within the text to show where the changes were made.

While this is obvious for alignment and margin changes, it's sometimes rather awkward to work out where tab positions had been changed. Moving the cursor through the document caused the ruler to change, and eventually the exact location could be isolated.

This is only a minor criticism because part of the concept of Easiwriter has clearly been to keep the document uncluttered. There are no paragraph-end markers, no formatting codes, no inserted rulers, just the text and graphics that you want printed.

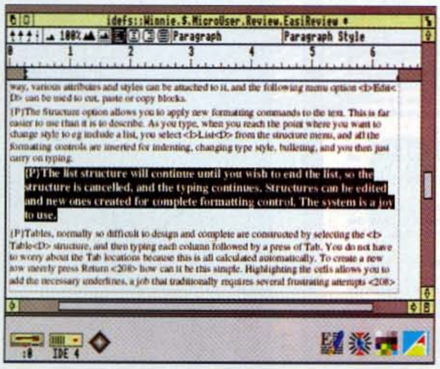
Easiwriter documents consist of *structures* containing paragraphs, chapters, sections, sub-sections, lists, and sub-lists, each structure defines a particular style.

In addition, documents can contain tables, figures and pictures into which Sprite and Draw files can be incorporated, scaled, cropped, and captions added.

Formatting controls can be assigned to each structure, so that for example you might wish to create a section that comprises a section heading in a large font, centred and underlined, followed by text divided into three columns, fully justified, with

➤

Product: EasiWriter
Price: £176.25 (£600 site licence)
Supplier: Icon Technology



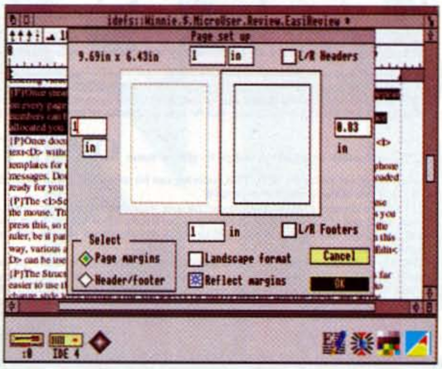
way, various attributes and styles can be attached to it, and the following menu option <I>Edit<D> can be used to cut, paste or copy blocks.

{P}The Structure option allows you to apply new formatting commands to the text. This is far easier to use than it is to describe. As you type, when you reach the point where you want to change style to eg include a list, you select <I>List<D> from the structure menu, and all the formatting controls are inserted for indenting, changing type style, bulleting, and you then just carry on typing.

{P}The list structure will continue until you wish to end the list, so the structure is cancelled, and the typing continues. Structures can be edited and new ones created for complete formatting control. The system is a joy to use.

{P}Tables, normally so difficult to design and complete are constructed by selecting the <I>Table<D> structure, and then typing each column followed by a press of Tab. You do not have to worry about the Tab locations because this is all calculated automatically. To create a new row merely press Return <208> how can it be this simple. Highlighting the cells allows you to add the necessary underlines, a job that traditionally requires several frustrating attempts <208>

Applying styles is easy



9.69in x 6.43in
1 in
☐ L/R Headers
1 in
0.83 in
1 in
☐ L/R Footers
◆ Page margins
◇ Header/footer
☐ Landscape format
☒ Reflect margins

Preparing the page

➤

vertical rules between each column.

To format each section individually would take a very long time and so a single section style cen be created to hold all the necessary formatting instructions.

Once the style has been designed you can either select the *Section* command from the Structure menu to tell Easiwriter that a new section has started, or wait until you have completed typing, and then mark the text and change it accordingly.

I found the system extremely easy to use once I had learned where all the formatting commands were hidden in the menu system. Being used to Ventura on the PC, I expected to see any formatting change instantly affect all parts of the document tagged with that style name.

In Easiwriter the changes only affect the marked text, unless you *Save Style Changes* at which point the changes made to the style are applied to every other relevant part of the document.

Going through the main menu options to pick out some of the more interesting features: *Misc* contains the Print command, which isn't accessible until you have loaded a printer driver.

You can select which pages are to be printed, but unlike Impression, there is no option for scaling to fit more than one page on to a sheet of paper.

The *Page setup* is very simple to use. On screen are displayed two blank pages, and you can adjust the margins for the page or the header/footer using either the mouse to drag, or entering values. The settings can be mirrored for left and right pages.

Once created, you can then click in the header/footer space to create the text that will appear on every page – or left/right page as appropriate.

Items such as date, title and page numbers can be included automatically, and if you have made an error in the amount of space allocated you merely go back and drag the page around as required.

Once documents have been prepared they can be saved in a variety of ways, including *text* without any formatting controls, documents, or as *stationery pads* – templates for use with other documents. For example, you might create a template for telephone messages.

Double-click on the icon, and all the formatting controls and any text stored is loaded ready for you to fill in the gaps without having to retype all the headings, date and so on.

The *Select* menu option enables you to mark blocks of text without having to use the mouse. This menu is duplicated by function key 11, and depending on how many times you press this, so more and more of the document is selected, the block being displayed above the ruler, be it paragraph, sub-section, section, document etc.

Once a block has been marked in this way various attributes and styles can be attached to it, and the following menu option *Edit* can be used to cut, paste or copy blocks.

The Structure option allows you to apply new formatting commands to the text. This is far easier to use than it is to describe. As you type, when you reach the point where you want to change style to include a list, you select *List* from the structure menu, and all the formatting controls are inserted for indenting, changing type style, bulleting, and you then just carry on typing.

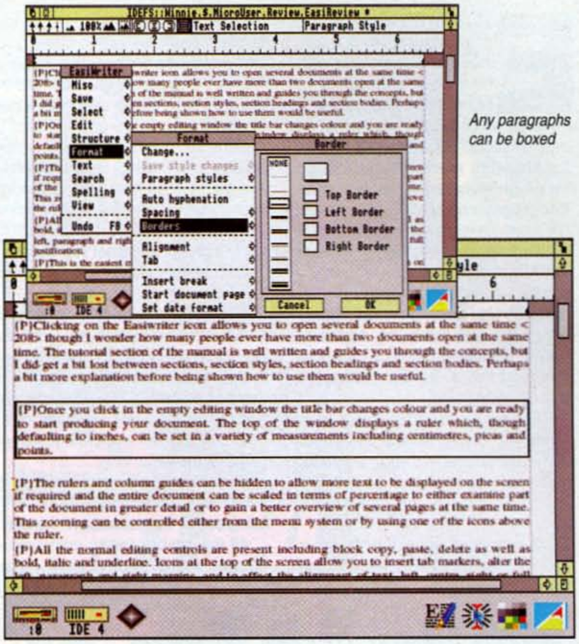
The list structure will continue until you wish to end the list, so the structure is cancelled, and the typing continues. Structures can be edited and new ones created for complete formatting control. The system is a joy to use.

Tables, normally so difficult to design and complete, are constructed by selecting the *Table* structure, and then typing each column followed by a press of Tab.

You do not have to worry about the Tab locations because this is all calculated automatically. To create a new row merely press Return – how can it be this simple?

Highlighting the cells allows you to add the necessary underlines, a job that traditionally requires several frustrating attempts – try doing it in WordStar on a PC – is completed in a fraction of the time normally taken.

The *Format* option allows the format of all structures to be changed, whether they be marked portions of text, paragraphs, sections, pictures or lists.



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(P)All the normal editing controls are present including block copy, paste, delete as well as bold, italic and underline. Icons at the top of the screen allow you to insert tab markers, alter the

Any paragraphs can be boxed

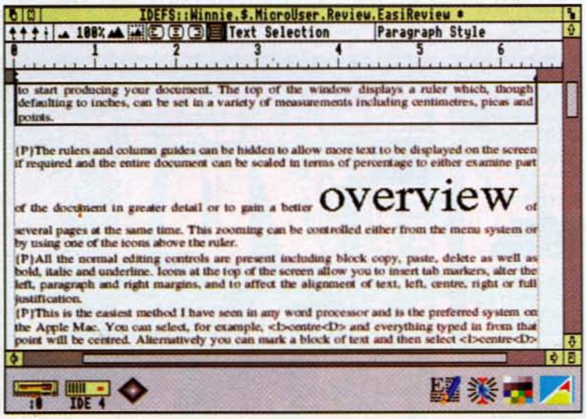
The space above or below the structure can be adjusted, borders and tabs added, alignment changes made, page or column breaks inserted and even white space can be added – this is a novel feature that I have not seen before.

A block of white space, adjustable by the mouse, is inserted at the text position to force text to move. This is much easier than pressing Return several times.

The *Text* menu allows the font style, size and colour to be altered, as well as the case, whether it be upper, lower or Proper case. These alterations can be stored as a text *emphasis* style so that you can subsequently mark a portion of text and instantly apply a multitude of changes to it with one mouse click.

Search and *Spelling* operate the usual search/replace and spell-checking functions. Also included is an interactive spelling checker that will bleep as you type. A press of F9 will then show the suggested replacement words but I did not like having to press Quit after pressing Replace.

The *View* menu controls the display of the document, both in terms of size, and whether the rulers, guides and pictures are displayed.



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Individual styles and colours are available

Summing up

I am both impressed and excited by this product. Easiwriter is of the highest quality and deserves very careful consideration by anybody looking for a comprehensive document production system if the extensive DTP facilities of Impression are not required.

A lot of thought has gone into its design, and a great deal of care has been lavished on the small details to make it really user-friendly.

Schools and colleges looking for an easy-to-use word processor will be interested in the discount available, and in particular primary schools should find out about the multiple site option, which is excellent value.

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Jet Fighter	£10
Jiglet	£25
Jigsaw	£27
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£15
Worldscape	£16
Miscellaneous	
Ancestry	£59
Arccomm Pack	£24
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Equasor	£40
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
Revelation	£62
Rhapsody in Blue 2	£45
Speech!	£15
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77			£77 each
Assembler; LISP; Prolog X			£149 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£55
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

Minerva's Archimedes Software

Home Accounts*	£36	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	
Nominal Ledger*	£53		£53
Ancestry	£59	Reporter	£29
System Delta+	£55	Mailshot*	£29
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

** Requires System Delta*

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing, Purchase Ledger, Sales Ledger & Stock Control
Price: **£78** per Module or
£299 for the complete Software Suite

ULTIMUM – Archimedes A3000 Podule Racking System

THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

Price: £125

Archimedes A300/A400 SCSI Hard Disc Offer

(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £1030

Offer Price: £475

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

- A300/A3000 **£21**
- A400 **£25**

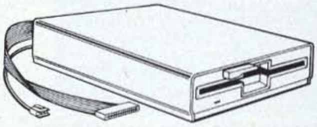
Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399** *(carr £7)*

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during July

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£115
Econet Module for the Master	£45
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Ecolink	£270

NEW LAUNCH for Archimedes

See Page 14 of our advert

Desk Top Publisher

Acorn's Archi DTP Package	£108
Impression 2 DTP Pack	£135
Impression Junior	£76
Tempest DTP Package	£95

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasyWord	£30

Databases

AlphaBase	£36	Multistore	£195
Knowledge Organiser	£42		

Spreadsheets

Intersheet Disc	£24	Viewsheet	£45
Sigmasheet	£39	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79 • Pipedream 3 £119
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £85

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Education Software

- Advanced Folio: 7-14 years. Has the simplicity of a basic wordprocessor with the presentation quality of a Desk Top Publisher £38
- Colourcopter & Numbercopter: 4-7 years. Flying start in pre-reading and pre-number skills
- Colourcopter includes 7 programs to develop matching, sorting, coordination, letter & word recognition £28
- Numbercopter: Includes 8 programs to develop memory, sequencing, logic, number, more and gone away, word order and rhythm skills £28
- Best Four languages 5-11 years: Four best selling programs which encourage children to work together to improve their linguistic ability £33
- Hands on Spelling 5-11 years: Promotes a visual approach to mastering spelling, linking the skill with other National Curriculum areas as hand writing, talking and reading. £30
- Asian Folio – Gujarati 80T £45
- Best Four Languages £35
- Best Four Maths £35
- Frieze 7-16 years £37
- Kaleidoscope 7-16 years £37
- Merlins Castle £22
- Maths 9-13 years £25
- Number in the National Curriculum £55
- Screenprint pack of 5 5-16 years £150
- Time Traveller 7-16 years £40
- The Lost Frog £22
- World Map Study 7-16 years £35

(More Educational software on page 10)

Call or write in for our NEW 100 page Summer Catalogue

Continued→ → → → → → → → →

Archi A4 Scanner

This new A4 image scanner from Watford Electronics is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

Introductory Prices:

Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

Z88 Portable Micro

£185

FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

32K RAM Pack or 32K EPROM Pack	£18.00
128K RAM Pack or 128K EPROM Pack	£42
512K RAM Pack	£175
Z88 Eprom Eraser Unit	£33
Z88 Spellmaster for Pipedream	£51
Z88 Carrying Case	£8
Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger Compact & Fast	£6
Z88 Serial Printer Cable	£8
Z88 Parallel Printer Cable	£25
Z88 to Archi Link	£15
Z88 to BBC Link	£20
Z BASE	£56
Z88 to PC Link II	£30
Z TAPE	£42
Z88 to Macintosh	£52
Z TERM	£42
Z88 Mains Adaptor	£9
Z88 Modem	£149

Archi Real-Time Digitiser

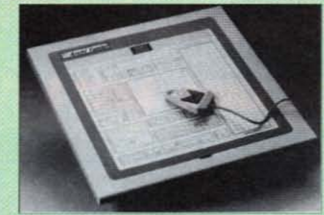
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

Watford sophisticated DFS ROM	£16.00
Watford DFS Kit complete	£69.00
We will exchange your existing ROM for Watford's ultimate DFS ROM at only	£12.00
DFS Manual (comprehensive)	£6.95
Acorn DNFS ROM	£17.00
Acorn ADFS ROM only	£25.00
Acorn 1772 DFS ROM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

SPECIAL PRICE	**£44.00**
DDFS Manual	(No VAT) **£6.95**
We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

10 x 5.25" S/S D/D 40T (744)	*£5*
10 x 5.25" D/S D/D 40T (745)	*£5*
10 x 5.25" S/S D/D 80 Track (746)	*£7*
10 x 5.25" D/S D/D 80 Track (747)	*£7*
10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT	*£9*
10 x 3.5" S/S D/D 40/80 Track	*£7*
10 x 3.5" D/S D/D 40/80 Track	*£7*
10 x 3.5" Double Sided High Density	*£13*

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

*10 x **M3** 3.5" D/S D/D 80 Track*	*£7*
*10 x **M9** 3.5" D/S High Density*	*£12*
*10 x **M4** 5.25" S/S D/D 40 Track*	*£5*
*10 x **M5** 5.25" D/S D/D 40 Track*	*£5*
*10 x **M7** 5.25" D/S D/D 80 Track*	*£7*
*10 x **M8** 5.25" D/S H/D Hi-Density*	*£9*
***M2** 3" Double Sided*	*£2.50 each*

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

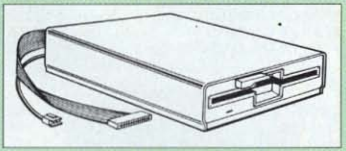
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, are the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

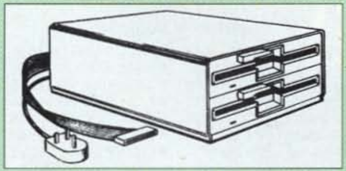
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	£72
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	£142
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	£82
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	£155

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer

- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£119** (Offer valid until stocks last)

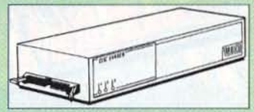
3.5" DISC DRIVE

These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	£62
• **CLD400S:**	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	£83
• **CD35:**	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable expansion to a dual drive at a later stage)

Disc Drive Sharer

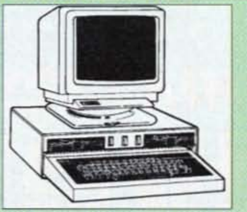


(Ideal for educational establishments)

A low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables **£55**

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

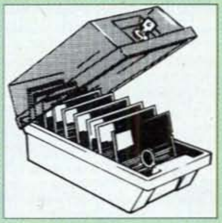
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs.

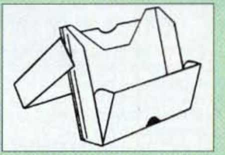
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

• **M35** – holds up to 50 5.25" discs	£4.95
• **M85** – holds up to 95 5.25" discs	£6.95
• **M25*** – holds up to 25 3.5" discs	£4.95
• **M50** – holds 50 3.5" discs	£6.50
• **M10** – holds 8 of No. 10 Data Cartridges	£15

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs.	£1.50
Holds up to 10 x 5.25" Discs.	£2.00

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

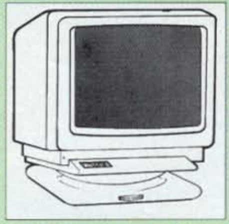
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50		£52 for 100

Continued→ → → → → → → → →



12 months FREE maintenance on site

Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium resolution, suitable for word processing in mode 0	£209
• **Cub3000** Medium Res for A3000	£189
• **1441** – High res, exceeds the capabilities of the BBC Micro	£359
• **2040 CS** 20" Hi Res	£675
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 5D	£1299
• Eizo 9070S	£579	• Taxan 770LR	£379
• NEC 2A	£255	• Taxan 775	£375
• NEC 3D	£345	• Taxan 795-PC	£425
• NEC 4D	£679	• Taxan 875	£725
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Philips

• **BM7502** 12" Hi-res Green Monitor	£70
• **BM7522** 12" Hi-res Amber Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£178
• TV Tuner for CM8833 Monitors	£62

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor . A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £176

Dust Cover for Philips Monitors £6

(Securicor carriage on Monitors £7)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10E	£205	£54		£18
BJ300	£354	£88	£65	£12
BJ330	£399	£110	£79	£12

• Spare Battery pack for BJ10E	£33

NEC Pinwriter Printers

• P20	£186	• P70	£475
• P30	£250	• P90	£655
• P60	£374		

Be Satisfied Before You Buy

We have on display, various Micros, Printers, Disc Drives, Monitors, etc. Call in at our showroom to evaluate before you buy.

Concept Keyboards

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Multiscan colour monitors, all Panasonic printers, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours.

(Offer applicable only when bought at prices advertised in this advert. UK mainland only).

Hewlett-Packard Printers

• # Desk Jet 500	£299	• Paintjet XL	£1092
• Desk Writer (Mac)	£482	• Quiet Jet Plus	£359
• Desk Jet Cartridge	£15	• HP Think Jet	£239
• Paint Jet Colour	£589	• Rugged Writer	£839

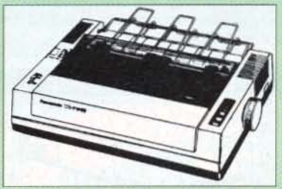
Now 3 years extended Parts & Labour warranty

• Paintjet Cartridges Black **£19;** Colour	£25
• Desk Jet 500 256K RAM cartridge	£129
• HP Epson FX Emulation Cartridge for Desk Jet	£59

HP Apple Talk Interfaces for

• Scan Jet	£299	• Paint Jet	£POA
• Desk Jet Unlimited (Book No VAT)			£19.75

Panasonic Printers



FREE with every **KX-P1081 & KX-P1180** Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of paper for other micros (please specify)

• **KX-P1081** 9pin 80col. 144/28 cps	£122
• **KX-P1180** 9pin 80col. 192/38 cps	£129
• **KX-P1123** 24pin 80col. 192/63 CPS	£158
• **KX-P1124i** 24pin 80col. 192/63 CPS	£215
• **KX-P1624** 24pin 132col. 192/63 CPS	£299
• **KX-P1695** 9pin 132col. 330/86 CPS	£299
• **KX-P1654** 24pin 132col.	£429

Above prices include FREE, Watford's 12 months on-site maintenance

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-1124 (P36)	£79	KX-P1180 (P37)	£70
KX-P1624/1695 (P38)	£124	KX-P1123 (P37)	£70

Buffers

P12 4K buffer Board for 1081	£55
P42 32K buffer Chip for 1592/1595	£16
P43 32K Buffer Chip for 1540/1124/1180	£16

Serial Interfaces

P17 P1081/1592	£32	**P19** P1124/1180	£49

Citizen Printers

120D Plus	£96	124D Printer	£138
Prodot 9	£205	Prodot 24	£225
Prodot 9X	£245	Swift 24#	£205
Swift 9	£138	Swift 24X	£279

• Prodot Cut Sheet Feeder	£120
• Swift 24 Colour Option	£29
• Swift 24 Ribbons Black **£4**	Colour **£13**

Special Offer this month – A FREE Colour option cartridge with every Swift 24 printer purchased from us.

Star Printers

• **LC10** 9pin 80col. 144/36 CPS	£112
• **LC15** 9pin 136col. 180/45 CPS	£180
• **LC24-10** 24pin 80col. 180/60 CPS	£150
• **LC24-15** 24pin 136col. 200/67 CPS	£295
• ***FR10** 9pin 300/76 CPS 31K 16 fonts	£229
• **FR15** Wide carriage version of above	£290
• ***XB24-10** 24pin 80col. 240/80 CPS	£299
• **XB24-15** 24pin 80col. 240/80 CPS	£365
• **XB-24** Colour Kit	£29
• **LC-200** Colour 9pin 80col. 180/45 CPS	£158
• **LC-24-200** 24pin 80col. 222/67 CPS	£189
• **LC24-200** Colour 24pin 80col. 222/67 CPS	£222

*FREE Colour Ribbon with these printers

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200	£49
8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15	£64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour	£29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200	£55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

• Canon LBP-4	4ppm	£655
• Canon LBP-8 IIIR	8ppm	£1505
• Canon LBP-8 IIIT	8ppm	£1389
• Epson EPL7100	6ppm	£689
• HP Laserjet III	8ppm	£1025
• HP Laserjet IIID	8ppm	£1539
• HP Laserjet IIIP	8ppm	£689
• HP Laserjet IIIsi	16ppm	£2499
• Panasonic KX-P4420	8ppm*	£648
• Panasonic KX-P4450i*	11ppm*	£1025
• Panasonic KX-4455 Postscript	11ppm*	£1699
• Qume Crystal Print Publisher 2		£1899
• Star LP-8 III		£979
• Star LP-8 Star(post)script		£1195
• Star LP-4 4ppm		£705
• Star LP-4PS Postscript 4ppm		£875

* Now 2 years warranty

Laser Toners

Canon 2 & 4	£54	Laserjet IIP & IIIP	£55
Epson GQ	£18	Laserjet II/D, III/D	£70
Star LP-8	£69	Qume Crystal	£56
KX-P4420/50	£22		

Laser RAM Upgrades

• IIP & III 1MB	£74	• EPL7000 2M	£365
• IIP & III 2MB	£109	• GQ5000 512K	£95
• II & IID 1MB	£76	• KX4420/50 1M	£115
• II & IID 2MB	£112	• KX4420/50 2M	£159
• II & IID 4MB	£299	• KX4420/50 4M	£349
• Canon LBP4 1M	£175	• Star LP8 1M	£143
• Canon LBP8 2M	£150	• Star LP8 2M	£285

Laser Drum & Developer

• Epson Drum	GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum		£60	Developer	£59
• Panasonic 4450 Drum		£93	Developer	£80
• Qume Drum		£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III	£255	IID & IIID	£265

NEW – HP Laserjet

Various Font Cartridges	£45
Superset Font	£195

Integrex Colour Jet

• Colour Jet 132 Printer	£515
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£19.50
• Black Cartridge	£11.25
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123

INCREDIBLE INKJET PRINTER OFFER

Laser print quality at dot-matrix prices

HP Deskjet 500 Printer	£299
Canon BJ10E Printer	£199

(Offer valid for the month of July only)

Epson Printers

DFX5000	£1089	LQ860 Colour	£465
DFX8000	£1999	LQ1050+	£475
EX1000	£456	LQ1060	£599
FX850	£283	LQ2550+	£709
FX1050	£358	LX400	£109
FX1060	£599	LX850	£150
LQ400	£166	SQ850	£439
LQ550	£209	SQ2550	£645
LQ850+	£385		

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550			£69
EX800/FX800/850/LQ800/850			£130
FX/LQ 1000/1050/SQ850			£159
LQ 2550	£390	SQ2550	£390

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

• EX800/1000 Colour Option	£45
• EX800/1000 Colour Ribbon	£14
• LQ2500 Colour Option	£65
• Multifont Card for LQ550/850/1050	£95

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£95	RS232 + 8K Buffer	£75

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£6
IBM/Archimedes Parallel Lead 5 metres	£13
IBM/Archimedes Parallel Lead 10 metres	£19
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Plotters

• HP7440	£425	• HP7475	£599

Roland Plotters

• DXY1100	£515	• DXY1200	£645
• DXY1300	£845	• DXY2500	£2375
• DPX3500	£3289	• Sketchmate	£333
• Roland plotter Pens, Fibre tip			£7.50

Watch this space
for another
NEW LAUNCH
for Archimedes
micro products

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
• 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
• 1,000 Sheets 15" x 11" Fanfold Paper	£9
• 2,000 Sheets 15" x 11" Fanfold Paper	£16
• 1,000 Sheets true A4 Fanfold Paper 70gms	£11
• 2,000 Sheets true A4 Fanfold Paper 70gms	£21
• Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Special Offer

Hitachi/Acorn 12" High Resolution, ergonomically designed Colour Monitors. Supplied complete with a swivel base and a BBC lead.

Only: £145 (While stocks last)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

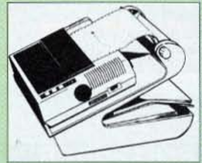
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110	for KX-P1081, 1592 & 1595				£7
P115	for KX-P1180	£7	**P145**	for KX-P1124	£7
P140	for KX-P1540	£8	**P155**	for KX-P1624	£10

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9.95 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics
2 to 1	£16	£17
3 to 1	£22	£24
5 to 1	£32	£36

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.

Centronics **£18;** Serial **£17**

(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	–	£89

256k Multi Spooler

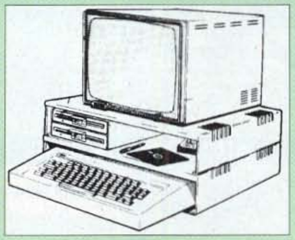
These Auto Centronics Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

• 2 In/2 out	£135	• 4 In/2 out	£169
• 8 In/1 out	£199		

Compact Converter Units

Serial to Parallel	£36	Parallel to Serial	£37

Plinths for the BBC B & Master 128K Micros

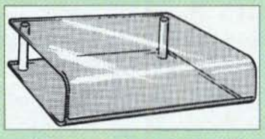


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Continued→ → → → → → → → →

QUEST MOUSE Mk III

• Quest Mouse III & Quest Paint	£59
• Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont	£89
• Quest Mouse III only	£30
• Quest Paint Software only	£34
• Quest Font Disc (22 Text Fonts)	£15
• Quest Mouse Mat (Red or Blue or Green please specify)	£3
• Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer	£18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30

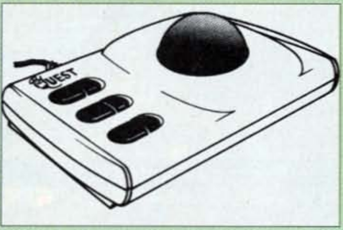
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version	**£27**
QT-20 Archimedes Version	**£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

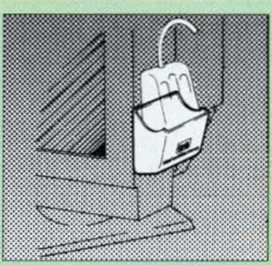
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

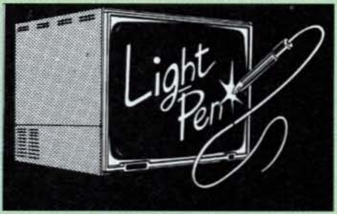
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

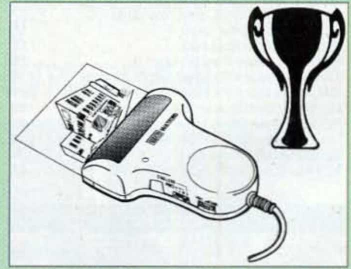
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£69**
Wapping Editor plus Mouse	**£89**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

NEW

At the request of many of our customers we are now able to offer training in the use of Wapping Editor DTP package. For further information please telephone 0923 37774 and ask for Tim or Shiraz

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Laser Direct

By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, !Draw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Special Price: £849

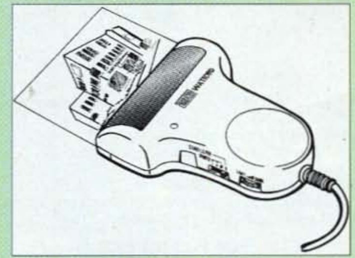
• Special High Res Laser Direct Card 600 DPI for Canon LPB4 Laser Printer	**£325**
• LPB4 Printer plus High Res Card	**£1025**

(For demonstration, call in at our retail shop)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

All prices are exclusive of VAT

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£175**

Continued→ → → → → → → → →

16K Disc Ram Module

(16K Sideways RAM Module)

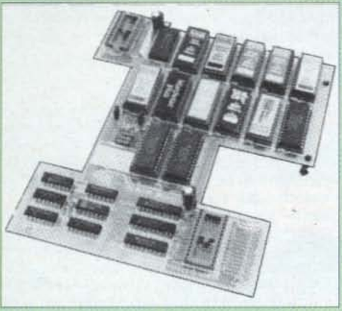
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for profressional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted **£3**

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

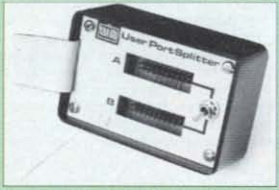
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

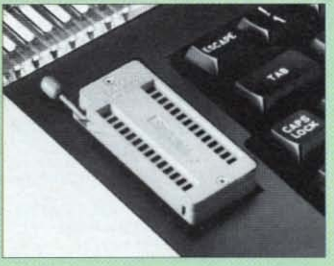
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18** (carr £3)

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

• Complete System	**£11**
• Spare Cartridges	**£2.75**
• Spare Rack	**£1.65**

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9;** Quad **£14**

Commander Joystick

Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.
Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Launch Price: £15

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

Voltmace Joysticks

Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£24**

Delta Base B

Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

ROM/RAM Card

Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

ROM/RAM card with 32k dynamic RAM	**£48**
ROM/RAM card with 64k dynamic RAM	**£65**
ROM/RAM card with a massive 128k dynamic RAM	£109

(carriage on ROM-RAM Card £3)

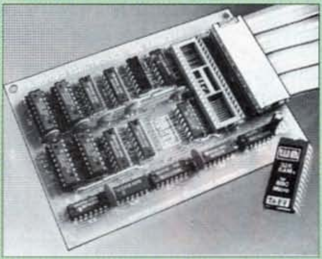
OPTIONAL EXTRAS:

16k plug-in Static RAM kit	£9
16k Dynamic RAM for Upgrade	£13
Battery backup	£3
Read and Write protect switches	£2 each
Complete ROM-RAM board All options installed	£115

P.S.

IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.

- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)

(Price includes a comprehensive manual and the ROM)

BBC SOFTWARE'S Popular Educational Software

Maths with a Story 1 (Disc). 4 primary level maths programs	£20.00
Maths with a Story 2 (Disc). 4 further maths programs.	£20.00
Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs.	£17.00
ECOLOGY O-Level program.	£20.00
POLYMERS O-Level program.	£20.00
Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule.	£20.00
ADVANCED TELETEXT SYSTEM	£8.65
PERIOD TABLE SOFTWARE	£20.00
Computers at Work – Primary	£17.35
Introducing Geography 11-17 years	£17.50
Electric Fields 6-14 years	£11.25
Espana Viva – 3 Discs	£19.95
WHITE KNIGHT Chess game	£16.00
A Vous La France	£29.00

More Educational Software

FUN SCHOOL 2 – Red: Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a Letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic.	£12.00
FUN SCHOOL 2 – Green: 6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump	£12.25
FUN SCHOOL 2 – Blue: Over 8 yrs – Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape.	**£12.50**
FUN SCHOOL 3 – Red	**£19.95**
FUN SCHOOL 3 – Green	**£19.95**
FUN SCHOOL 3 – Blue	**£19.95**
Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+	£26
More French Games – Another 6 games 12 years+	£26
Au Restaurant and Accident de Route 12 years+	£26
Boulogne and Oh-Les – 2 programs for beginners	£26
Letters to French Penpals – 11 years+	£26
French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16	£22
Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+	£22
More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+	£22
The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages	£26
An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years	£26
Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years	£26
The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years	£22
PUNCMAN Learning punctuation Puncman 1 & 2 for 7 – 13 years	£15
Puncman 3 & 4 for 8 – 14 years	£15
Puncman 5 & 6 for 8 – 15 years	£15
Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+	£18
Letters & Pictures – Introduces phonic skills to Infants 6-8 years	£15
Numbers & Pictures – Early number learning is a great fun (4-6 years)	£15
Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults)	£15
Maps & landscapes No. 1 (9-14 years)	£18
Help Your Child learn Basic Map work No. 2 (9-14 years)	£18
Pirate – Educational Adventure (8-14 years)	£15
Spelling Week by Week (6-14 years)	£18

Archimedes Software

Bookbinder	£43
BUMPER DISC	£14
Bumper Disc 2	£14
Craftshop 1	£26
Craftshop 2	£26
Desktop Stories	£27
DigiSim	£35
Droom	£17
Jiglet	£27
Jigsaw	£28
Numerator	£60
Snippet	£26
Fun School 2A Red (up to 6 years)	£12
Fun School 2A Green (6-8 years)	£14
Fun School 2A Blue (8 years +)	£14
Gate Array Teaching System	£68

Continued→ → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£28
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
TERMI	£25
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
View Professional	£50
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell with 80 track disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Overview packs 1 & 2	£65
Hi-View	£38

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

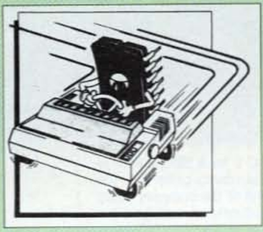
(When ordering please specify for which Micro & 40 or 80 track Disc)

All prices are exclusive of VAT

View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £33

CREDIT CARD
24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

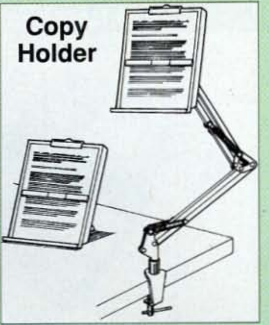
BEEBPLOT – Provides visual representation from Spreadsheet data.

Only £10 (Disc)

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

Printer Commands Revealed

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

ALL PRICES EXCLUDE VAT

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	**£10.95**
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Arm Assembly Lang. Prog. Manual	£15
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
Basic V – A Dabhand Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
BBC Computer Handbook – The Complete	**£14.95**
BBC Micro – Within the	£11.95
BCPL User Guide	£9
C Big Red Book of	£8.95
C – A Dabhand Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
Hackers Handbook – New	£9.95
ISO-PASCAL Reference Manual	£9.95
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Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £15.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.
Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.
A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: **£14.95** (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.
Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued→ → → → → →

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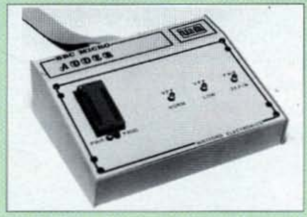
ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

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- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£65 (£5 Carr)

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EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER EB** – Standard version erases up to 16 chips. **£32**(carr £3)
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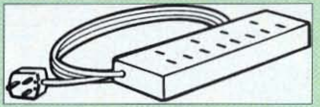

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SOLDER type **£1.50** IDC CRIMP type **£1.95**

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Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00;** Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

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65C12	**£9.00**
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75453	**£1.00**
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Assorted ROMS

ACORN ADFS	**£25**
ACORN BASIC 2 plus User Guide	**£22**
Acorn BCPL	**£42**
ACORN DNFS	**£17**
Acorn FORTH	**£32**
Acorn Graphics	**£25**
Acornsoft C Disc	**£36**
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Termulator Master	**£32**
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ULTRACALC II	**£26**
1Mb OS ROM	**£39**

Hi-Speed, Low Cost Hard Disk Drives for Archimedes

The Watford IDE Interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes User. Over the last few years PC hard disc manufacturers have been working towards the goal of integrating the drive controller onto the hard disc, eliminating the need for an expensive controller card.

Now this has been achieved and drives are available under names such as IDE (Integrated Drive Electronics) or ATA (AT Attachment). These drives require only simple interfacing to a PC motherboard and reduce the overall cost of installing a hard disc. Because of the integration of the controller and drive electronics onto one compact board, manufacturers have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

The Watford interface allows IDE drives to work on any Archimedes machine, speeds equivalent to SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer tate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for extenral drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- IIDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- IIDEFSDisk, creates PC emulator hard discs

*Commands

*IDEFS

Selects the IDE filing system 'IDEFS'.

*IDEDrives

Displays the configuration and native characteristics of installed drives.

*Configure IDEFSDirCache

*Configure IDEFSBuffers

*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

PRICES

Part No.	Capacity	Access Speed	Price
ADA 0520	44MB	28ms	**£249**
ADA 0530	89MB	19ms	**£395**
ADA 0540	130MB	19ms	**£599**
ADA 0550	142MB	15ms	**£699**
ADA 0560	188MB	15ms	**£780**
ADA 0570	200MB	15ms	**£825**
ADA 0580	330MB	15ms	**£TBA**
ADA 0590	670MB	15ms	**£TBA**

All the above drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting)
Ideal for use with A300/A400/A500 Series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300	External Case & PSU for Above	**£85**

Internal Hard Disc Drives for A3000

ADA 0700	21MB	28ms		**★£315**
ADA 0720	44MB	28ms	**Available**	**£TBA**
ADA 0730	89MB	19ms	**Soon**	**£TBA**

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

HARD CARDS

Hard Disc on Cards for Archimedes

2.5" Hi-Speed Hard Disc Drive on a controller card.
"Simply plug and play"
For Archimedes A300 and 400 series machines

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(Can be used as a Removable Hard Drive)

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In business

Can the Archimedes really become a machine that professionals will use? Steve Turnbull examines the issues and some new software that may lead the way

THERE's no doubt that the Archimedes and BBC A3000 computers give unparalleled performance at a cost-effective price – which should make it ideal for business.

But Acorn's staid and academic profile, along with their traditional position as merely suppliers of robust educational computers, gives them a severe disadvantage against the likes of the Apple Mac and the PC clones.

The problem is different in each case: Against the PC it is sheer weight of numbers – the current estimate is 40 million machines worldwide – and PC magazines in the USA reach 800 pages every issue.

The Apple Mac has a much more modest user base at something over four million, but it's quality and ease of use of the software that makes the Mac so popular.

Interestingly Apple provides the one encouragement for Acorn. While the world was buying user-aggravating PCs, Apple designed the world's first windowing system and built their computer around it.

For the first few years the Mac had a very slow growth but suddenly blossomed into popularity. Acorn's 32 bit machines might go that way too, perhaps.

However it's naive to think that any company is going to scrap its existing machines and buy Acorn's just because they're nicer or their children use them in school. The only way into the professional market is through integration.

Acorn went a very short way down that path with its first, rather limited, PC Emulator. The fact that it existed at all was impressive, but it couldn't really be used to sell the Archimedes.

Now Acorn are releasing an upgraded version which operates faster, has a better PC operating system, provides improved graphics handling and, with sufficient memory, allows the PC software to run in a window on the Risc OS DeskTop, windows within windows.

Acorn hopes that families will buy an Archimedes or BBC A3000 because their children use it at school, but with the advantage that if a parent uses a PC at work the Emulator allows them to use the 32 bit machine at home with the same files.

This will eventually encourage the workers to speak out about wanting Acorn computers rather than PC clones. It may work, but it's a very long term plan.

Software compatibility is the other side of the coin. Obviously a PC or Mac program can't work in the native Risc OS mode, but file compatibility can provide the key. For example, the spreadsheet Schema, from Clares, will load Lotus 1-2-3 files, and 1st Word Plus files are equivalent on all the machines that it is available for.

Public domain software is rife in this area with the superb software by John Kortink for converting between the screen formats of all the major computers plus any number of other single operation converters.

The final point is software availability: If someone in business wants to write a letter to all his clients, names held on a database can he do it?

Mailmerging is a fundamental business operation. Who knows how many mailmerging programs exist for the PC? Probably hundreds, and how many for the Archimedes?

Integration can be summed up simply: If, as a businessman, I buy an Archimedes or A3000 for my office which already contains other types of machine, will it be any use? In a business environment a computer must justify its existence.

The Acorn machines have the potential to outperform every other micro on the market. Turning that potential into reality is the hard part and it's left to the few major players in the Acorn market to do the donkey work.

The software that needs to be produced must surpass the quality of equivalent programs on the other machines, must work faster, should be at least as easy to use and accept all known file formats.

In the professional field price is less of an issue, in fact too low a price can be a problem: "If it's cheap it must be nasty". However once quality is confirmed then a low price is a bonus.

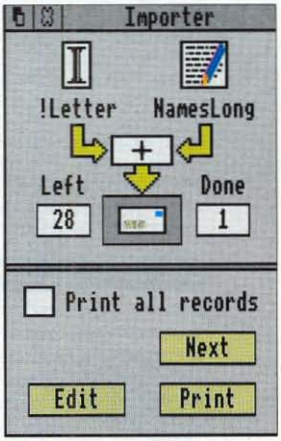
With so few big software houses turning out packages so slowly is there any hope? Thankfully the answer is yes. And it's the veteran of the Acorn world, Computer Concepts, who are leading the way.

Their latest release, the Impression Business Supplement, provides professional-quality facilities and their public domain Impulse system – examined next month – could revolutionise how new software is written.

Product: Impression Business Supplement
Price: £49 (£57.57 including VAT)
Supplier: Computer Concepts Ltd., Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Tel: 0442 63933

ALTHOUGH combined into one release the Business Supplement is really three different products, which all come on one disc along with a 48 page manual.

The first, and simplest, is the addition of five new loader modules. Impression provides a number of these modules that allow you to bring in text from other text processing software, without the problems associated with strange control codes.



The Importer dialogue box

The ones provided with Impression allow files from Basic, Acorn DTP, 1st Word Plus, Inter-Word, View and Wordwise Plus to dragged directly into an Impression document.

Each of these loaders applies to a piece of software on either the Archimedes or BBC Micro, except for Acorn DTP and 1st Word Plus where the file could have been created by the equivalent program on another machine.

The Business Package contains loaders for many professional packages used on other machines, namely RTF – Rich Text Format – which is a method of storing lots of information about text rather than just the bare words.

It can include details like text colour, formatting, typefaces and character sets. Not all the RTF information is supported by the loader.

RTF is rapidly gaining popularity, and most major pieces of word processing software on the Mac and PC support it.

There's also a program called !MapUtil which helps with the font matching when loading files from other machines. There area specific file loaders for WordStar, WordStar 4.0 and Word Perfect. A generalised loader for any pure text file containing Return characters at the end of every line, and double Returns for paragraphs. This type of file is often generated by PC *save as text* options.

One major omission from the Acorn-based wordprocessor loaders was one for PipeDream – also known as View Professional. A loader is supplied on the Business Supplement along with copious notes in the manual about how to use it. The PipeDream file format is not simple.

Mailmerging

IMPRESSION is an odd piece of software, being a DTP program that's easy to use as a wordprocessor. Or is it a wordprocessor with sophisticated DTP facilities? Well, whatever it is, Computer Concepts have now gone a stage further and given it the ability to mailmerge.

In other words you can write one letter then send it to hundreds of people, so that each recipient is referred to by name and personally addressed. But the letter could be any Impression document, complete with graphics if required.

The merging process is controlled by an application called Importer which uses the Impulse system to control an Impression document. You drag the file of the letter – or whatever – on to the Importer dialogue window, at which point Impression is started up and the document loaded ready, and then drag a text file containing the name and address data on to the window.

You're then ready to merge, you can either print the whole lot or proceed a record at a time. The document in Impression can't be edited while the merging is in progress – a sensible move – and the pointer turns into a big red X to show you.

To make the document take in data from the information file you write your letter and at the appropriate positions insert a special merge command.

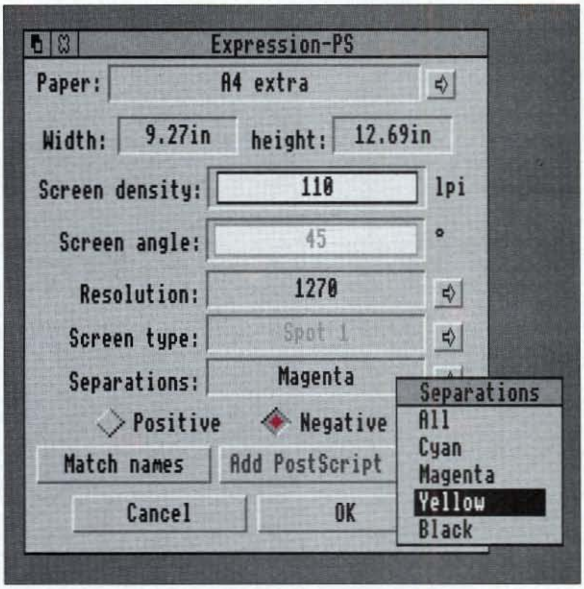
These are entered via the appropriate dialogue box available from a menu or pressing Shift+Return. Personally I'm not so keen on the key shortcut as I often press it by mistake, but it's not fatal.

The commands you can have are:

```
:Importer GetField n
:Importer GetTimeDate [<FormatString>]
```

The first reads the *nth* field of the current record and inserts it while the second allows you to acquire the current date as a text string which is then included in the printout. The *FormatString* allows you to control exactly how the date appears.

The whole operation is controlled via the Impulse system which provides inter-task communication and control. This is provided as public domain software and the Importer is a very simple example of the sort of software that can be written. Next month we'll be presenting an article on Impulse and what it can achieve.


Expression-PS

Paper: A4 extra

Width: 9.27in height: 12.69in

Screen density: 110 lpi

Screen angle: 45 °

Resolution: 1270

Screen type: Spot 1

Separations: Magenta

◇ Positive ◆ Negative

Match names
Add PostScript
Cancel
OK
Separations
All
Cyan
Magenta
Yellow
Black

The Expression dialogue box with colour separation menu

Imagesetting

ALTHOUGH only a third of the package this final item is, perhaps, the most significant from the professional viewpoint. But to explain why needs some background information.

In the bad old days of publishing – about two years ago – books, magazines, pamphlets and flyers were all produced in much the same way:

Someone would originate some text which would be given to a typesetter. He would type it in to a machine that would print high-quality output to the required text sizes and column width.

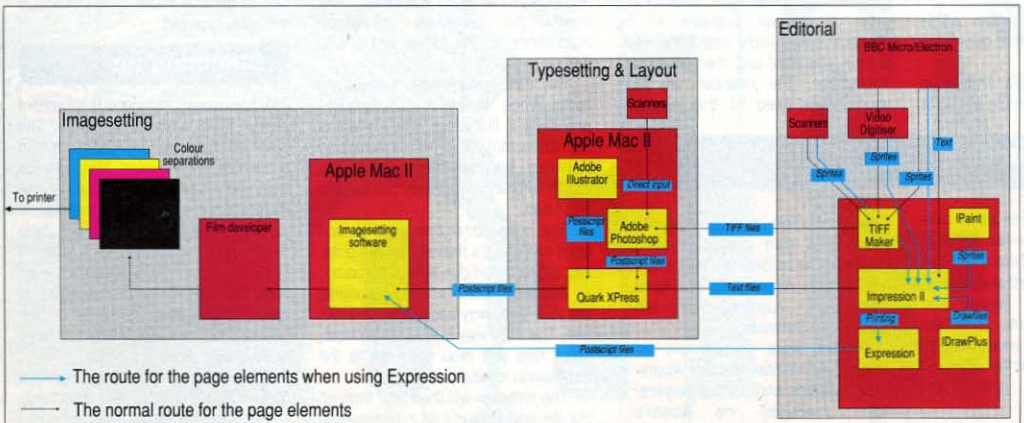
This was then passed to another person who created the layout by chopping up the high-quality output and sticking it down on the page.

Spaces were left for colour pictures while black and white ones could be photographed via a special screen and added to the layout.

The screen created the pattern of dots that you can see quite clearly in newspaper photos.

Once the layout was approved it could be photographed and turned into a film which was then used to create

➤


Imagesetting
Colour separations
To printer
Film developer
Apple Mac II
Imagesetting software
Postscript files
Typesetting & Layout
Scanners
Apple Mac II
Adobe Illustrator
Direct input
Postscript files
Adobe Photoshop
Postscript files
Quark XPress
TIFF files
Text files
Postscript files
Editorial
BBC Micro/Electron
Scanners
Video Digitiser
Text
Sprites
Sprites
Sprites
TIFF Maker
!Paint
Sprites
Impression II
Printing
Drawfiles
Expression
!DrawPlus
The route for the page elements when using Expression
The normal route for the page elements

How The Micro User *gets into print*

➤

the metal printin/g plates the whole lot finally being transferred to paper.

Printing in colour presented further problems: Four colours were, and are, used – cyan, magenta, yellow and black. These are called the process colours. And to produce a colour page you need four printing plates which means four film negatives, but each negative must contain the colour information separated from the rest.

Producing an area containing a tint of colour meant sending detailed instructions to the printer about exactly what colours should be printed where and at what density.

If photographs were to be included they added their own problems. A special process was required to produce the colour separations and then each of the four negatives had to be cut into the layout negatives with precise alignment.

The advent of professional desktop publishing technology, pioneered on the Apple Mac, meant that all the traditional cut and paste could be done away with, only colour photos still provide problems. But high quality colour scanning can produce the necessary digitised image.

The diagram on the previous page shows the stages that *The Micro User* goes through to get to the four final negatives that are sent to the printer.

The Imagesetter is a specialised piece of software that treats the film developer as a printer, but with 1200 to 2500 dots per inch – a good laser printer is only 600 dpi.

The key ingredient in the whole system is the software that generates the colour separations.

Without this you are limited to monochrome film or printing to paper and marking the output for colour. As it stands the system works well, Europress Publications produces five computer titles where all the original text and pictures is generated on the native machines, be they BBC Micro, Archimedes, PC, ST or Amiga. This is then transferred to the Mac IIs and all typesetting and layout is done there.

The final result is transferred to film using Imagesetting software and all the commercial printer has to do is produce the final hardcopy.

The Apple Mac dominates this field, and though Impression is a very sophisticated piece of software and it was possible to produce monochrome Postscript files using the existing printer driver from any Risc OS software. Four colour work has been denied to the Archimedes. Until now.

> **‘Using Expression is quite simple’**

The third section of the Business Supplement is Expression, a simple utility that slots between the printer driver and the application and allows you to produce four colour separation on any Impression document.

In fact, true to the philosophy of the Archimedes, Expression will work with any software that can use the Acorn's Postscript printer driver – it's available separately for £23.50.

Using Expression is quite simple, despite the potentially bewildering array of options available in its dialogue box. Simple select the separation you want and then print from Impression. The chances are that you'll never need all the available complex options, as the preset values are typical.

The early version of the manual covers quite a bit of ground on what four colour printing is all about, how to produce spot colour, and how to choose an imagesetting bureau.

What this current manual fails to mention is the rather awkward mechanics involved in creating a set of four Postscript files to give to your bureau.

Briefly, if you are printing to disc – which is the most likely situation – you have to select that option from the printer driver's iconbar menu, and change the file name for each separation.

Additionally you will probably need to set the *Negative* option in the Print setup dialogue box of Impression. However there's more to Expression than just colour separation.

With Acorn's Postscript printer driver if you add a new font that is Postscript-compatible you have to edit a file inside the printer driver application so that it can be recognised and the name changed to the Postscript equivalent. This is difficult for the non-expert who's only interested in using the machine, not learning its ins and outs.

Expression has an exhaustive list of font equivalence, automatically recognises what's available and inserts the necessary conversion instructions. It also allows you to add names to the list.

But this system has a disadvantage: When testing the software I produced a file which only used the Homerton font, which corresponds to Helvetica, but the Postscript file contained references to every compatible font I had.

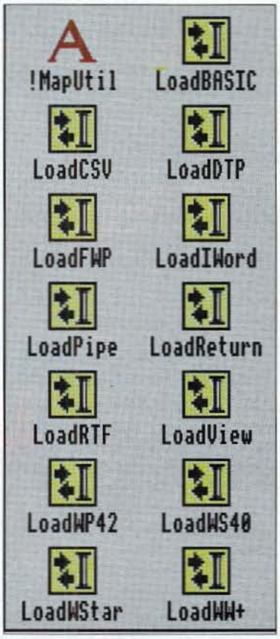
The Imagesetter then tried to load each one into it's memory before printing, and crashed due to lack of room.

Thankfully there are two solutions, the slow easy way and the quick tricky one. The easy way is to drag the Postscript files and drop them on to the Expression iconbar icon.

The software will then look through the file and take out all references to fonts that aren't actually used.

However this really is slow, 15 minutes for a 160k file using a hard disc – and another test, involving a sprite, produced a 2.4Mb file, and there are four files per separation.

The quick way is to load the Postscript file into !Edit and manually remove the offending lines. This should only be attempted if you know what you're doing and you'll need the ram to do it. A faster legal solution is definitely required.



The complete selection of loaders

Summing up

The Impression Business Supplement serves three types of customer. The small business can profit from the high quality of mailmerging that can be achieved, it may be simple but the quality of output makes it excellent.

The additional loaders will help incorporate text from many different sources into a single document – no other DTP software has this level of connectivity and as soon as a new format becomes popular all CC have to do is write another module.

The colour separation software gives the Archimedes the opportunity to replace the Apple Mac in some places. It's a lower cost machine, with power that's certainly up to scratch and the software is catching up fast.

Eating the pudding

This whole article has been produced on an Archimedes 320 with 40Mb hard disc to show what can be done on a standard machine.

Text entry and layout was done with Impression, Jonathan Marten's !DrawPlus was used for the diagram, Snippet by 4Mation was used to grab the screenshots.

The corner logo was an Illustrator 88 file loaded into !ShowPage by Computer Concepts. The resulting sprite image was also processed with !Translatr to reduce the size without loss of detail. The IDE hard disc was supplied by Ian Copestake Software.

Proofs were printed on an Apple LaserWriter via an AppleTalk network and colour seperations produced via Acorn's !PrinterPS and Expression. Final films were produced by Bridg-It imagesetting software.

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Easy Loader

Paul Dellar makes the Archimedes DeskTop even more user-friendly

WHILE the Risc OS DeskTop is certainly an excellent environment for running applications and manipulating files, it can be a little less helpful when it comes to writing or modifying programs.

So here's a way of loading, rather than running, a file from the DeskTop by double-clicking on its icon while holding down the Shift key.

This facility is most useful for loading Basic programs but there are plenty of other possible uses, for instance loading obey files into Edit or merging sprite files into the Wimp sprite pool.

The program is written as a relocatable module so that it stays resident in the machine until you press Control+Reset.

The other advantage to writing the program as a module is that it takes up exactly the amount of memory it needs – about 1200 bytes for the program and workspace.

The amount of memory allocated to application tasks, such as the programs on the Applications Discs, is always a multiple of the memory controller's page size, which is 8k on a 1Mb machine and larger on machines with more memory.

Getting started

Type in the Listing – Loader_src – and use the checksums to remove any typing mistakes.

Run the program to assemble the module, which is called DeskLoad, and then copy it into a convenient directory.

You should then be able to start the module by double-clicking on its icon from the DeskTop.

You can check that the module has been loaded by opening the Task Manager window – the name *File Loader* should appear in the list of module tasks.

While the Task Manager window is open, drag the *Next* slot to about 160k, and double-click on a Basic program icon while holding down one of the Shift keys.

Basic's startup message should appear in a window on the screen, followed by the > prompt. Type LIST to show that the program has been loaded and you can now edit it as you wish.

The way in which files of a particular filetype are treated when you double-click on them with Shift held down is controlled by a group of system variables of the form:

```
Alias$@LoadType_xxx
```

where xxx is the filetype in hexadecimal, just as the normal run action is controlled by the variables:

```
Alias$@RunType_xxx
```

You can display a list of the load actions currently defined by typing:

```
*Show Alias$@LoadType_###
```

Any filetype which does not have an associated *Alias$@LoadType* variable will produce the error message *No load action specified for this file type* when you try to load it – just as you may have got the equivalent *No run action specified for this file type* when double-clicking some other files.

The DeskTop only provides the ability to run files – by double-clicking them – although in some cases these run actions are converted into load actions.

You can add new load actions or change existing ones so that Shift+double-click performs a load instead of a run. Some useful examples of load aliases are:

```
*Set Alias$@LoadType_FF9 IconSpr
ites %0
*SetMacro Alias$@LoadType_FEB
*Set Alias$@LoadType_FFB FX138,0
,69|MFX138,0,68|MFX138,0,46|MFX1
38,0,13|MSetDirOf %0|MBasic -loa
d %0
```

The first example loads sprite files into the Wimp sprite pool, which is useful when you are editing an application's icon, say, using !Paint.

The next one sets the load action for Obey files to be the same as the run action for text files, which is usually set to run !Edit and be loaded into it. This means you can then examine an Obey file just by Shift+double-clicking it.

HOW IT WORKS

Whenever you double-click on an icon in a directory window the Filer sends a message to each active task in turn, giving them an opportunity to load the file rather than letting the Filer *Run it. This message, which is called Message_DataOpen in the Programmer' Reference Manual, is trapped by the DeskLoad module.

The module checks whether a Shift key is held down, and if it is the message is acknowledged by sending back a Message_DataLoadAck with the same parameter block.

The DeskLoad module then executes a *Load command, using the filename supplied in the parameter block, using the SWI call Wimp_StartTask.

This call is similar to OS_CLI, except that it starts a new Wimp task which is independent of the task making the call, like the New task option on the Task Manager's menu.

Notice the use of *SetMacro which means that the load alias will change to reflect any changes in the run alias.

Unfortunately if !Edit is already running this method loads another copy of it – there's no really easy way round this. But if !Edit is already loaded you can just drag the Obey file anyway.

The third example is for Basic programs, and loads the program into Basic, sets the current directory to the one containing the file, and then starts the Basic Editor.

The *FX138 commands are used to insert the abbreviated EDIT command *ED.* into the keyboard buffer.

You can't just include *ARMBE in the alias as the expansion of the alias stops as soon as a new task, such as Basic, has been started.

The DeskLoad module also provides a new command: *SetDirOf which sets the current directory to the directory containing the specified file.

For example, *SetDirOf $.Apps.!Edit.!Run sets the current directory to $.Apps.!Edit.

If you want the module to be loaded automatically, as in a !Boot file, the best way is to include:

```
*RMRun $.Modules.DeskLoad
```

in a text file called DeskBoot say, and then start the DeskTop with *Desktop-file DeskBoot, as described on page 391 of the User Guide.

Another possibility is to use two commands, *RMload $.Modules.DeskLoad followed by *Desktop.

The first loads the module but does not run it, the second one starts or restarts the desktop, which then starts up the module.

Notice that you can use *Desktop from within the DeskTop to start up a new module task without affecting any tasks already running.

➤

```
 10 REM > <BasicSave$Dir>.Loader/Src
   20 REM by Paul Dellar
   30 REM (c) The Micro User
   40 :
   50 DIM code% &1000
   60 PROCassemble
   70 SYS "OS_File",10,"DeskLoad",&FFA,,
code%,0%
   80 END
   90 :
  100 DEF PROCassemble
  110 block=1
  120 worksp=12
  130 sp=13
  140 link=14
  150 null$=CHR$(0)
  160 FOR pass%=0 TO 3 STEP 3
  170 P%=0:O%=code%
  180 [OPT pass%+4
  190   EQUD start_code
  200   EQUD initialise
  210   EQUD finalise
  220   EQUD service
  230   EQUD title_string
  240   EQUD help_string
  250   EQUD command_table
  260   EQUD 0
  270 \
  280 .title_string
  290   EQUS "DeskLoad"+null$
  300 .help_string
  310   EQUS "Desktop Loader"
  320   EQUB 9
  330   EQUS "1.00 ("+MID$(TIME$,5,11)+"
)"+null$
  340   ALIGN
  350 \
  360 .command_table
  370   EQUS "DeskTop_Loader"+null$
  380   ALIGN
  390   EQUD command_code
  400   EQUD 0
  410   EQUD command_syntax
  420   EQUD command_help
  430 \
  440   EQUS "SetDirOf"+null$
  450   ALIGN
  460   EQUD setdir_code
  470   EQUD &010101
  480   EQUD setdir_syntax
  490   EQUD setdir_syntax
  500   EQUD 0
  510 \
  520 .command_help
  530   EQUS "*DeskTop_Loader starts the
 desktop loader module, you should norma
lly use just *DeskTop instead."
  540   EQUB 13
  550 .command_syntax
  560   EQUS "Syntax: *DeskTop_Loader"+n
ull$
  570 \
  580 .setdir_help
  590   EQUS "*SetDirOf <filename> sets
the current directory to the directory c
ontaining the specified file."
  600   EQUB 13
  610 .setdir_syntax
  620   EQUS "Syntax: *SetDirOf <filenam
e>"+null$
  630   ALIGN
  640 \
  650 .initialise
  660   STMFD   (sp)!,{link}
  670   MOV     R0,#6
  680   MOV     R3,#&140
  690   SWI     "OS_Module"  \ claim &14
0 bytes of workspace
  700   STRVC   R2,[worksp]  \ store poi
nter if it's valid
  710   LDMFD   (sp)!,{pc}
  720 \
  730 .finalise
  740   STMFD   (sp)!,{link}
  750   BL      close_down   \ quit Wimp
  760   MOV     R0,#7
  770   LDR     R2,[worksp]
  780   SWI     "OS_Module"  \ free work
space
  790   LDMFD   (sp)!,{pc}
  800 \
  810 .command_code       \ this starts
up module through
  820   STMFD   (sp)!,{link} \ its langu
age entry point
  830   MOV     R2,R0
  840   ADR     R1,title_string \ module
 title
  850   MOV     R0,#2
  860   SWI     "XOS_Module" \ run modul
e start code
  870   LDMFD   (sp)!,{pc}
  880 \
  890 .setdir_code      \ entered with R0
 pointing to command tail
  900   STMFD   (sp)!,{link}
  910   LDR     worksp,[worksp] \ retrie
ve workspace pointer
  920   SUB     R1,worksp,#1 \ (using pr
eindexed addressing so need
  930 .loop                \ to subtract 1 f
rom the address)
  940   LDRB    R2,[R0],#1   \ copy comm
and tail into workspace
  950   CMP     R2,#32     \ (tail termin
ated by control character
  960   STRGEB  R2,[R1,#1]   \ or space)
  970   BGT     loop   \ R1 points to th
e terminating character
  980 \                   \ (not the one af
ter as would happen
  990 \                   \ with post-index
ed addressing)
 1000 .loop2
 1010   LDRB    R2,[R1],#-1  \ set R1 to
 point to the last full-stop
 1020   CMP     R2,#ASC"."   \ or colon
in the pathname
 1030   CMPNE   R2,#ASC":"
 1040   BEQ     exit_loop
 1050   CMP     R1,worksp
 1060   BGT     loop2      \ return witho
ut an error message
 1070   LDMFD   (sp)!,{pc}   \ if the co
mmand tail is just a leafname
 1080 \
 1090 .exit_loop         \ replace the ful
l-stop with a null
 1100   CMP     R2,#ASC":"   \ byte or a
dd a null byte after the colon
 1110   ADDEQ   R1,R1,#1
 1120   MOV     R0,#0
 1130   STRB    R0,[R1,#1]
 1140   MOV     R1,worksp
 1150   SWI     "XOS_FSControl" \ set cu
rrent directory
 1160   LDMFD   (sp)!,{pc}   \ and leave
 1170 \
 1180 .start_code
 1190   LDR     worksp,[worksp] \ get wo
rkspace pointer
 1200   ADD     sp,worksp,#&140 \ create
 SVC stack at top of workspace
 1210   BL      close_down   \ prevents
module being started twice !
 1220 \
 1230   MOV     R0,#200    \ wimp version
 number
 1240   LDR     R1,task_string  \ 'TASK'
 1250   ADR     R2,title  \ title for ta
sk manager window
 1260   SWI     "XWimp_Initialise"
 1270   LDMFD   (sp)!,{link} \ pull link
 register so we can return if needed
 1280   STRVC   R1,task_handle  \ store
my task handle
 1290   BVC     polling_loop \ go to Wim
p_Poll loop if everything OK
 1300   MOV     pc,link    \ exit if some
thing goes wrong
 1310
 1320 .task_string EQUS "TASK"
 1330 .task_handle EQUD 0
 1340 .title    EQUS "File Loader"+null$
 1350   ALIGN
 1360 \
 1370 .service       \ module service cal
ls are received here
 1380   STMFD   (sp)!,{link}
 1390   LDR     worksp,[worksp]
 1400   CMP     R1,#&49    \ Service_Star
tWimp ?
 1410   BEQ     start_wimp
 1420   CMP     R1,#&4A    \ Service_Star
tedWimp ?
 1430   BEQ     started_wimp
 1440   CMP     R1,#&27    \ Service_Rese
t ?
 1450   BEQ     reset_pressed
 1460   LDMFD   (sp)!,{pc}
 1470 \
 1480 .start_wimp
 1490   LDR     link,task_handle
 1500   CMP     link,#0
 1510   MVNEQ   link,#0
 1520   STREQ   link,task_handle\ set ta
sk handle to -1 if not running
 1530   ADREQ   R0,command_table\ pointe
r to command to start task
 1540   MOVEQ   R1,#0      \ claim servic
e call
 1550   LDMFD   (sp)!,{pc}
 1560 \
 1570 .started_wimp       \ if task hand
le=-1 then set
 1580   LDR     link,task_handle\ task h
andle to zero
 1590   CMN     link,#1
 1600   MOVEQ   link,#0
 1610   STREQ   link,task_handle
 1620   LDMFD   (sp)!,{pc}
 1630 \
 1640 .reset_pressed      \ set task han
dle to zero
 1650   MOV     link,#0
 1660   STR     link,task_handle
 1670   LDMFD   (sp)!,{pc}
 1680 \
 1690 .polling_loop
 1700   MOV     R0,#%110011  \ mask out
reason codes
 1710   MOV     R1,worksp
 1720   SWI     "XWimp_Poll"
 1730   CMP     R0,#17     \ check for in
coming message
```

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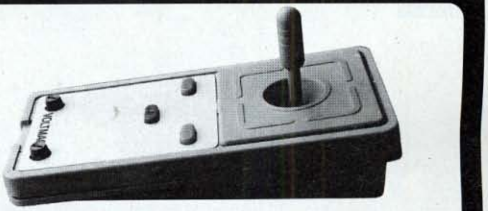

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➤

```
 1740   CMPNE   R0,#18
 1750   CMPNE   R0,#19
 1760   BNE     polling_loop  \ keep pol
ling until a message arrives
 1770 \
 1780   LDR     R0,[block,#16]
 1790   CMP     R0,#0     \ Message_Quit
 (type 0) ?
 1800   BLEQ    close_down
 1810   CMP     R0,#5     \ Message_Data
Open (type 5) ?
 1820   BLEQ    clicked_on_icon
 1830   B       polling_loop \ continue
polling loop
 1840 \
 1850 .close_down
 1860   STMFD   (sp)!,{link}
 1870   LDR     R0,task_handle  \ is the
 task handle valid ?
 1880   CMP     R0,#0
 1890   LDRGT   R1,task_string
 1900   SWIGT   "XWimp_CloseDown"\ quit
Wimp if it is
 1910   MOVGT   R0,#0
 1920   STRGT   R0,task_handle  \ set ta
sk handle to zero
 1930   LDMFD   (sp)!,{pc}
 1940 \
 1950 .clicked_on_icon
 1960   STMFD   (sp)!,{R0,R1,link}
 1970   MOV     R0,#&81
 1980   MVN     R1,#0     \ check whether
 Shift is held down using
 1990   MOV     R2,#&FF  \ OS_Byte &81,-
1,&FF
 2000   SWI     "XOS_Byte"
 2010   LDMFD   (sp)!,{R0,R1} \ retrieve
 R0,R1 from stack
 2020   CMP R2,#&FF
 2030   LDMNEFD (sp)!,{pc}     \ exit if
Shift wasn't held down
 2040 \
 2050   LDR     R2,[block,#40]    \ chec
k that clicked object is a file
 2060   CMP     R2,#&1000   \ (filetype
not &1000 or &2000)
 2070   CMPNE   R2,#&2000
 2080   LDMEQFD (sp)!,{pc}     \ exit if
it isn't
 2090 \
 2100   MOV     R0,#20         \ acknowledg
e load
 2110   STR     R0,[block]
 2120   LDR     R0,[block,#8]
 2130   STR     R0,[block,#12]    \ copy
 'my_ref' to 'your_ref'
 2140   MOV     R0,#4
 2150   STR     R0,[block,#16]    \ Mess
age_DataLoadAck
 2160   MOV     R0,#17
 2170   MOV     R2,#0     \ broadcast mes
sage
 2180   SWI     "XWimp_SendMessage"
 2190 \
 2200   MOV     R0,#ASC"L"     \ insert
text 'Load ' before filename
 2210   STRB    R0,[block,#39]
 2220   LDR     R0,load_text
 2230   STR     R0,[block,#40]
 2240 \
 2250   ADD     R0,block,#39   \ start n
ew Wimp task with 'Load <filename>'
 2260   SWI     "Wimp_StartTask"
 2270   LDMFD   (sp)!,{pc}    \ and retur
n
 2280 \
 2290 .load_text EQUS "oad "    \ text to
 insert before filename
 2300 ]:NEXT:ENDPROC
```

Get it right ✓

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 723C D
  60 = 126A A
  70 =  B78 D
  80 = FD2E 4
  90 = 9719 B
 100 = 98A5 E
 110 =  708 C
 120 = 2052 6
 130 =  641 D
 140 = A0B5 6
 150 = 9A59 3
 160 = 420C B
 170 = AAAE 5
 180 = 4334 8
 190 = 35F6 F
 200 = 5D13 9
 210 = 98CE 4
 220 = 9D71 D
 230 = 805D D
 240 = ED8E 2
 250 = C31E 3
 260 = AED4 A
 270 =    0 A
 280 = AFD3 D
 290 = B3BA E
 300 = A748 9
 310 = 94F1 4
 320 = 8D5D 6
 330 = B9FC 2
 340 = 24FA 3
 350 =    0 3
 360 = 9893 0
 370 = 90AF 7
 380 = 24FA C
 390 = DC3C D
 400 = AED4 C
 410 = AFB2 E
 420 = CEDF A
 430 =    0 A
 440 = 5618 5
 450 = 24FA B
 460 = 6366 2
 470 = 3D99 6
 480 = 5A3E 3
 490 = 5A3E D
 500 = AED4 F
 510 =    0 F
 520 = E151 A
 530 = 613D 6
 540 = 92BC B
 550 = C92C 5
 560 = 1C5F A
 570 =    0 A
 580 = 3B43 B
 590 = 325E F
 600 = 92BC 0
 610 =  1B3 C
 620 = 4FE6 9
 630 = 24FA 6
 640 =    0 6
 650 = 5B39 5
 660 = 4AB1 9
 670 =  A43 4
 680 = 51EC 9
 690 = 8951 0
 700 = C426 6
 710 = 31B3 8
 720 =    0 8
 730 = 5F0B C
 740 = 4AB1 1
 750 = DF48 6
 760 = 1A62 D
 770 = 8669 C
 780 = 8951 A
 790 = 31B3 7
 800 =    0 7
 810 = 47B0 7
 820 = 7CEC 4
 830 = BC85 3
 840 = 75E1 0
 850 = 4AC7 3
 860 = 2392 2
 870 = 31B3 2
 880 =    0 2
 890 = D106 F
 900 = 4AB1 3
 910 = 7955 9
 920 = AE6F 8
 930 = C7EE 5
 940 = 83AD 5
 950 = FD1D 7
 960 = D583 3
 970 = B59B 6
 980 =    0 6
 990 =    0 6
1000 =  372 8
1010 = E4B8 A
1020 = 3B5D 6
1030 = BCEF 1
1040 = 3437 2
1050 = 34BA 5
1060 = E498 3
1070 = 1D89 B
1080 =    0 B
1090 = 4E95 5
1100 = B601 2
1110 = 9214 4
1120 = 6A85 0
1130 = 9067 D
1140 = 47E4 6
1150 = B17A D
1160 = 1D89 E
1170 =    0 E
1180 = 33DC 6
1190 = 7955 C
1200 = E69A 9
1210 = DF48 3
1220 =    0 3
1230 = 310A F
1240 = 4E9A 6
1250 = D49E E
1260 = D19B F
1270 = 5F84 D
1280 = 7435 E
1290 = 357A A
1300 = A263 3
1310 = D1AD 9
1320 = 3576 5
1330 = 97CA E
1340 = B925 D
1350 = 24FA 9
1360 =    0 9
1370 = C20D 0
1380 = 4AB1 2
1390 = DA37 A
1400 = AC89 7
1410 = 9FFB 9
1420 = 6B3F 8
1430 = 4472 6
1440 = C356 F
1450 = 97A1 8
1460 = 31B3 4
1470 =    0 4
1480 = A826 6
1490 = 45B2 B
1500 = 1368 4
1510 =  E66 D
1520 = 890C 9
1530 = 6142 1
1540 = 6FDB E
1550 = 31B3 1
1560 =    0 1
1570 = 3798 C
1580 = 45B2 1
1590 = 91CC 3
1600 = D276 1
1610 = 890C 3
1620 = 31B3 1
1630 =    0 1
1640 =  D48 1
1650 = 9BEF 0
1660 = 18A7 2
1670 = 31B3 9
1680 =    0 9
1690 = DFA1 A
1700 = A365 8
1710 = 47E4 8
1720 = 2353 7
1730 = 936D 1
1740 = 99C0 E
1750 = 89E1 5
1760 = C485 C
1770 =    0 C
1780 = 8E5F 9
1790 = B543 7
1800 = 46E5 8
1810 = F642 D
1820 = 5A7A 1
1830 = 5B86 7
1840 =    0 7
1850 = 1279 3
1860 = 4AB1 7
1870 = F6B4 5
1880 = 19AA 0
1890 = E764 8
1900 = E280 5
1910 =  A5C 8
1920 = 62B8 6
1930 = 31B3 B
1940 =    0 B
1950 = 4FE3 D
1960 = F017 1
1970 = 7E41 0
1980 = C668 F
1990 = 6326 D
2000 = BB48 3
2010 = C251 A
2020 =  BFA 2
2030 = 6255 0
2040 =    0 0
2050 = 4B13 3
2060 = 2C74 7
2070 = 821C 1
2080 = 8233 F
2090 =    0 F
2100 = AFEE 5
2110 = 78FE C
2120 = 8E3C E
2130 = A247 C
2140 = 2A01 3
2150 = A4E6 7
2160 = 3D69 3
2170 = FD79 D
2180 = DF5A C
2190 =    0 C
2200 = 39C6 7
2210 = 81D1 6
2220 = 4081 6
2230 = B308 7
2240 =    0 7
2250 = A704 9
2260 = B4D3 3
2270 = 1D89 B
2280 =    0 B
2290 = 7F49 7
2300 = 953B C
====================
==============
```

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Plotting a course

R T Poet gives a few pointers on how to get good results from your plotter

A FLAT-bed X-Y plotter is a useful addition to a home micro computer, but is usually bought by people with a specific requirement for engineering data output, such as printed circuit board production or manufacturing drawings, along with commercial PCB or CAD software packages.

These may not be suitable for the production of graphs needed in school projects or for the preparation of overhead transparencies, for which the plotter is ideal.

Most pen X-Y plotters can be connected to any of the Acorn BBC - Archimedes computers as parallel via their serial ports.

Most plotters require instructions in a special language, but a fairly common one is HPGL. Unfortunately, examples in the manuals are PC-oriented and need to be translated into BBC Basic.

So let's take a look at some software intended to drive a Roland DXY1200. It has been checked on both an Archimedes and a Model B.

Getting started

If you don't want to be bothered with details you can just type in the listings, eliminate any typing errors using the checksums, use them without any need to understand how they work, and reproduce the example outputs.

But it's much better to take the time to learn how to adapt the examples in the plotter handbook, see how they have been used in these listings and then become confident to adapt and improve them for future use.

The command to select a pen is SP followed by an integer number – 1 to 8 – corresponding to the pen required. In the manual this is shown as a Basic (PC style) line:

```
100 LPRINT "SP1;"
```

which is equivalent to BBC Basic:

```
   90 VDU2
  100 PRINT "SP1;"
  110 VDU3
```

The VDU commands turn the output on and off. Logically, the VDU commands are needed only at the beginning and end of the total output to be sent to the plotter, not repeated for every output.

Note also that the text string enclosed in the quotation marks consists of three elements – a two letter operation code, a single value and a semi-colon terminator. A more flexible way to specify a pen may be to use a variable name to which a value has been assigned earlier in the program. Thus the line 100 could be:

```
100 PRINT "SP";pen;";"
```

and if the value of *pen* is five then *SP5;* is output to the printer. The three elements are now the literal string "SP" followed by a semi-colon to indicate to the BBC Micro that the next element does not need a space or new line.

Then comes the name of the variable whose value is five with another semi-colon, and the final single character string which is the terminator of the command sent to the plotter.

Thus writing an output program for the plotter is simplified to selecting the correct sequence of plotter commands to initialise, selecting a pen, moving to one position with the pen up, to the next with the pen down and eventually returning the pen to the holder.

The LB (label) command is used to draw text strings on the plotter. It expects the termination character to be CHR$(3) but this is used by BBC Micros to terminate output to a peripheral.

The solution is to substitute VDU 1,3 for CHR$(3) as this only sends the 3 to the peripheral device and does not use it internally. Thus the example from the plotter handbook:

```
40 PRINT#1, "LBLABLE COMMAND";CHR$(3)
```

becomes:

```
40 PRINT"LBLABLE COMMAND":VDU1,3
```

The messages sent from the BBC Micro roll up the screen as they are entered into the plotter buffer. To make it easier to read you can press Control+N before running the programs. This stops screen scrolling after and prevents further output from being sent until Shift is pressed.

The plotter lifts the pen while awaiting more instructions and after a wait returns to its home position. It repositions and continues when sent the next screenful of instructions.

There are three listings which show the use of a plotter. GeogInp collects data that relates to the findings of an opinion poll carried out in a number of different areas on a variety of subjects.

The results are plotted for each area as a histogram of satisfaction for all topics, then as a histogram of the response of all areas to a given topic.

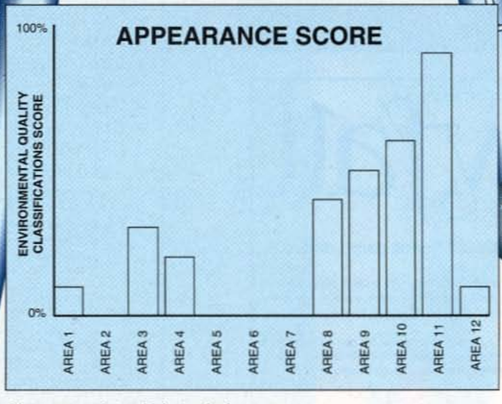
The data collection program Geoginput asks for a file name, then checks to see that this is a new file name by attempting to read (line 210) a file with the name just given.

If there is currently no file with the name the system thinks (wrongly) that there is an error and carries out PROC error specified by line 190.

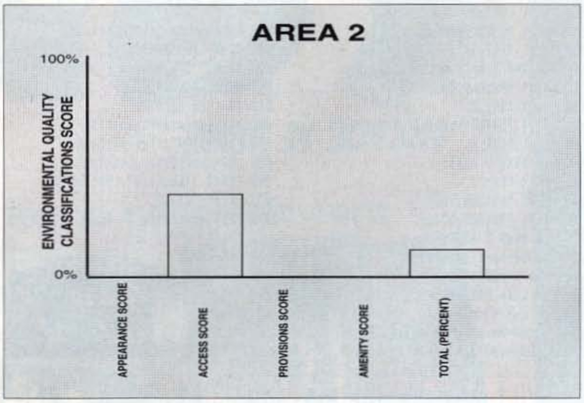
The lines 860 to 870 tidy up the attempt to open a non-existent file, resets the error handler and starts the data input procedure.

The remainder of the program finds out how many questions have been asked in how many areas and saves the results in the file whose name was first specified.

Thus the same data collection program can be used to collect many sets of data. To make your own data file run the program Geoginput and supply suitable data at all the prompts. The program checks the entries for reasonableness and will request inputs that are rejected. The two plotting programs are two versions of the same plotting plan, but the order of the



Plotter out put is to a high standard



nested loops is changed as are the labels to give the required output. This description is for GEOGDT2, plots by area.

The program requires the input of a valid data file name, then extracts the values of the numbers of areas and questions to set up arrays for the data, then fills the arrays from the data.

When the paper has been loaded on the plotter, a pen selected and a speed specified it proceeds to draw a plot. It then asks for the paper to be changed, a pen selected again so that all the plots can be made on a new sheet or on the same sheet in a different colour.

The speed needs to be specified for different combinations of pen (felt tip or ink) or paper (paper or drafting film) in order to obtain the best result. The value is used in line 350 of the output program.

The program assumes that the paper size select DIP switches are left at A3. The paper size used is A4 so the plotting area and scale must be specified. It is designed so that the maximum X and Y values never exceed 100,000, so line 370 gives these values.

The absolute plotting values for a horizontal A4 sheet are horizontally 0 to 11040 and vertically 0 to 7721. To leave space for binding, only 0-5000 is used vertically.

To preserve a 1:1 vertical to horizontal relationship 0 to 5000 is also used horizontally but 1000 has been added to both values to move the plot to the right on the paper. Hence line 390 is: IP 1000,0,6000,5000. To use more of the paper try: IP 1000,0,9000,6000.

A variable number of topics are allowed for, so the width of a histogram is calculated in line 110, which assumes that the left vertical text takes up 1000 units horizontally and the bars 9000 units of the 10,000 specified in line 390.

The remainder of the program is straightforward, with sufficient REMS in it to allow the function of each section to be deduced.

The second plotting program, GEOGDT3, uses the same techniques but has the loops nested in a different order, so plots the response to questions by area.

Using the example output programs

Load either GEOGDT2 or GEOGDT3. At the prompt *What is the datafile name?* enter ENVIRON Return, if you are using the supplied disc, or the name you gave when running GEOGINPUT.

At the prompt *Paper ready?* place an A4 sheet lengthways in the plotter in the bottom left-hand corner and enter Y Return. At the prompt *Which pen?* select a suitable pen number.Do likewise at the *Speed?* prompt.

The program will now draw the first set of histogram plots. When it has finished, change the paper and continue to draw the rest of the plots.

```
 10 REM > <BasicSave$Dir>.GEOGINPUT
 20 REM ARCHIMEDES TO ROLAND DXY1200
 30 REM DATA INPUT PROGRAM
 40 REM by R.T.POET
 50 REM (c) The Micro User
 60 max_areas=12: REM (areas surveyed)
 70 max_number=18: REM (of questions)
 80 max_letters=16: REM (in questions)
 90 max_value=100: REM (% result)
100 @%=00000004
110 P$="Please give "
120 D$="data file name "
130 B$="Blank filename, equals end"
140 PRINT P$+D$;: INPUT filename$
150 IF filename$=""PRINT B$ : END
160 PROCduplicate
170 PROCleave      : REM finished
171
180 DEFPROCduplicate
190 ONERROR PROCerror:PROCleave
200 fileref=OPENIN filename$
210 INPUT# fileref,number
220 PRINT "RETRY WITH NEW FILENAME."
230 CLOSE# fileref:END
240 ENDPROC
241
250 DEFPROCdatain : REM main procedure
260 ONERROR OFF:REM restore to normal
270 fileref= OPENOUT filename$
280 PRINT "Ready to input data for ";
290 PRINT filename$
300 Q$="How many Questions in survey "
310 REPEAT
320 PRINT Q$;"(max ";max_number;") ";
330 INPUT reply
340 IF reply>max_number VDU7
350 UNTIL reply<=max_number
360 number = reply
370 PRINT# fileref,number
380 PRINT P$;"number of AREAs (max ";
390 PRINT max_areas;" )";:INPUT reply
400 IF reply > max_areas VDU7:GOTO380
410 areas = reply
420 PRINT# fileref,areas
430 DIM result(areas)
440 FOR question = 1 TO number
450 REPEAT
460 PRINT "QUESTION ";question
470 PRINT P$;"question text (max ";
480 PRINT max_letters;" ) charac-
ters";
490 INPUT A$
500 A$ = LEFT$(A$,max_letters): VDU7
510 B$=STRING$(max_letters-LENA$," ")
520 PRINT "Is >";A$+B$;"< correct ?";
530 INPUT" Y/N ", reply$
540 UNTIL((reply$="Y")OR(reply$="y"))
550 PRINT# fileref,A$
560 REPEAT
570 FOR area = 1 TO areas
580 T$ = "Result for area "
590 PRINT "Question ";A$+B$+T$;
600 PRINT area; " (0 to 100%) ";
610 INPUT "please ", result(area)
620 IF result(area)>100 VDU7:GOTO590
630 NEXT area
640 PRINT"Question ";question;
650 PRINT " inputs  are :-"
660 FOR area = 1 TO areas
670 PRINT result(area);
680 NEXT area
690 PRINT'"Are the results correct ";
700 PRINT "for ";A$+B$; :INPUT reply$
710 UNTIL((reply$="Y")OR(reply$="y"))
720 FOR area = 1 TO areas
730 PRINT# fileref, result(area)
740 NEXT area
750 NEXT question
760 ENDPROC
761
770 DEFPROCleave
780 CLOSE# fileref
790 @%=10
800 M$ ="Data saved on diskfile "
810 PRINT M$;filename$
820 END
830 ENDPROC
831
840 DEFPROCerror
850 CLOSE# fileref
860 ONERROR OFF
870 PROCdatain
880 ENDPROC
```

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```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 =    0 0
 50 =    0 0
 60 = F218 8
 70 = 2E1E E
 80 = 1FC1 E
 90 =  AAC 0
100 = B3A4 B
110 = BC77 A
120 = C3F5 D
130 = 92C2 9
140 = F776 3
150 = 2DD7 4
160 = 8EB6 0
170 = 5792 6
171 = D1AD A
180 = 3D74 B
190 = BCC2 8
200 = C0EC 6
210 = 27CB 9
220 = 4096 D
230 = BABC 5
240 = ED0F 1
241 = D1AD 0
250 = A591 7
260 =  609 9
270 = DB5B 9
280 = 5D9E B
290 = E819 7
300 = 4145 4
310 = BFBA 4
320 = 1C0D 6
330 = 7B25 E
340 = 8873 9
350 = 4458 B
360 = 4314 0
370 = AE38 8
380 = 5AE5 6
390 = E5B3 9
400 = 738A 3
410 = 4D69 F
420 = F3F8 5
430 = 395D 3
440 = FD21 0
450 = BFBA A
460 = 7E84 5
470 = 2668 5
480 =  5A0 A
490 = DDF4 F
500 = 98D2 B
510 = C4E3 D
520 = 6F62 C
530 = 24CB 1
540 = B867 5
550 = 27C9 9
560 = BFBA 1
570 = A800 5
580 = 2178 B
590 = E2C9 6
600 = 7985 9
610 = 66D8 D
620 = B759 4
630 = DC99 6
640 = 8628 B
650 = 161E D
660 = A800 7
670 = 289C 5
680 = DC99 4
690 = 3451 2
700 = 9835 D
710 = B867 C
720 = A800 7
730 = 3653 0
740 = DC99 6
750 = 7EB2 1
760 = ED0F 4
761 = D1AD 9
770 = F45F 4
780 = EA14 B
790 = 1D60 A
800 = C6E2 5
810 = 2FFE 5
820 = FD2E 1
830 = ED0F 4
831 = D1AD F
840 = D7A7 A
850 = EA14 3
860 = 1193 3
870 = BD4A 0
880 = ED0F E
```

```
 10 REM >GEOGDT2
 20 REM PLOTTER PROGRAM FOR DXY-1200
 30 REM 1 PLOT FOR EACH AREA
 40 REM by R.T.POET
 50 REM (c) The Micro User
 60 Q$ ="WHAT IS THE DATAFILE NAME"
 70 PRINT Q$;:INPUT datafile$
 80 fileref=OPENIN datafile$
 90 INPUT# fileref, number
100 INPUT# fileref, areas
110 barsize=9000/number
120 DIM question$(number)
130 DIM ans(number, areas)
140 FOR question=1 TO number
150 INPUT# fileref,question$(question)
160 FOR area = 1 TO areas
170 INPUT# fileref,ans(question,area)
180 NEXT area
190 NEXT question
200 CLOSE# fileref
210 D$="Data from datafile "
220 PRINT D$;datafile$
230 FOR area = 1 TO areas
240 REM Check paper / pen / speed:-
250 REPEAT
260 INPUT"Paper ready? (Y)",B$
270 UNTIL((B$="Y") OR (B$="y"))
280 REPEAT
290 INPUT"WHICH PEN? (1 TO 8) ", pen
300 UNTIL ((pen<9) AND (pen>0))
310 REPEAT
320 INPUT"SPEED? (1 to 42) ",speed
330 UNTIL((speed<43)AND(speed>0))
340 VDU2 :REM TURN ON OUTPUT
350 PRINT"IN;SP";pen;";VS";speed;";"
360 REM SET TEXT TERMINATOR:-
370 PRINT"DT":VDU1,3
380 REM ADJUST FOR A4 PAPER:-
390 PRINT"IP1000,0,6000,5000;"
400 REM PLOT VALUE RANGE 10000:-
410 PRINT "SC0,10000,0,10000;"
420 REM HEADING LABEL:-
430 PRINT "PU;PA5000,9500;"
440 PRINT "SR3,3;"
450 PRINT"LBAREA ";STR$(area):VDU1,3
460 PRINT "SR1,1;"
470 REM 1ST VERTICAL AXIS LABEL:-
480 PRINT "PU;PA250,3500"
490 PRINT "SR1.6,1.6;"
500 L1$="ENVIRONMENTAL QUALITY"
510 PRINT "DI0,1;LB";L1$:VDU1,3
520 REM 2ND VERTICAL AXIS LABEL:-
530 PRINT "PU;PA750,3500"
540 L2$=" CLASSIFICATION SCORE"
550 PRINT "DI0,1;LB";L2$:VDU1,3
560 PRINT "SR1,1;"
570 REM BOTTOM Y-AXIS VALUE:-
580 PRINT "DI1,0;"
590 PRINT "PU;PA0,2900"
600 PRINT "SR2,2;"
610 PRINT "LB0%":VDU1,3
620 PRINT "SR1,1;"
630 REM TOP Y-AXIS VALUE:-
640 PRINT "PU;PA0,8900"
650 PRINT "SR2,2;"
660 PRINT "LB100":VDU1,3
670 PRINT "SR1,1;"
680 REM DRAW Y AXIS:-
690 PRINT "PA;"
700 PRINT "PU1000,9000;"
710 PRINT "PD1000,3000;"
720 REM DRAW X AXIS:-
730 X=1000+barsize*number
740 PRINT "PD";STR$(X)",3000;"
750 REM DRAW BARS(S):-
760 FOR question = 1 TO number
770 X=1000+barsize*(question-1)
780 Y=3000+(60*ans(question,area))
790 PRINT "PU";STR$(X);",3000;"
800 PRINT "PD";STR$(X);",";STR$(Y);";"
810 X=1000+barsize*(question)
820 PRINT"PD";STR$(X);",";STR$(Y);";"
830 PRINT "PD";STR$(X);",3000;"
840 REM LABEL BARS:-
850 X0=1000+barsize/2
860 X=X0+barsize*(question-1)
870 PRINT "PU";STR$(X);",500;"
880 LB$=question$(question)
890 PRINT "DI0,1;LB";LB$:VDU1,3
900 PRINT "DI1,0;"
910 NEXT question
920 PRINT "SP0;":VDU 3
930 NEXT area
940 VDU 3
950 END
```

Get it right ✓

```
 10 =    0 0  | 170 = A7AA 4 | 330 = 1275 8 | 490 = ED54 D | 650 = 8898 9 | 810 = F0B2 D
 20 =    0 0  | 180 = DC99 9 | 340 = 6A3E 9 | 500 = 3777 D | 660 = 1164 C | 820 = CAC5 D
 30 =    0 0  | 190 = 7EB2 F | 350 = AFB1 E | 510 = BE7C 3 | 670 = 3F1A C | 830 = A6E7 2
 40 =    0 0  | 200 = EA14 C | 360 =    0 E | 520 =    0 3 | 680 =    0 C | 840 =    0 2
 50 =    0 0  | 210 = CD2F C | 370 = F4A5 D | 530 = 1C8B 0 | 690 = 6C2F 1 | 850 = 4ADE 7
 60 = 317C C  | 220 = FD37 4 | 380 =    0 D | 540 = 5476 0 | 700 = 4CFA D | 860 = 6230 0
 70 = E08A A  | 230 = A800 3 | 390 = 755C 8 | 550 = 66FE 0 | 710 = FEDD C | 870 = 57C7 3
 80 =  AF8 6  | 240 =    0 3 | 400 =    0 8 | 560 = 3F1A B | 720 =    0 C | 880 = 4BA7 F
 90 = 3AFF D  | 250 = BFBA 3 | 410 = E511 8 | 570 =    0 B | 730 = B1CF E | 890 = E29F 6
100 = D618 D  | 260 = 8B13 6 | 420 =    0 8 | 580 = FF33 A | 740 = 1D54 D | 900 = FF33 3
110 =  1F8 9  | 270 = 52D1 B | 430 = 4D57 8 | 590 = 9450 6 | 750 =    0 D | 910 = 7EB2 6
120 = 30E9 C  | 280 = BFBA 1 | 440 = 15F9 C | 600 = 8898 8 | 760 = FD21 A | 920 = BB9E 1
130 = A5E4 0  | 290 = 9110 1 | 450 = 7EFC F | 610 = BBD3 6 | 770 = CB77 5 | 930 = DC99 F
140 = C866 0  | 300 = C1FA C | 460 = 3F1A 6 | 620 = 3F1A 4 | 780 = 887A B | 940 = 8CD6 7
150 = 28C0 C  | 310 = BFBA 6 | 470 =    0 6 | 630 =    0 4 | 790 = 2DC9 F | 950 = FD2E 7
160 = A800 0  | 320 = B962 E | 480 = 6B47 E | 640 = D2FE E | 800 =  9B0 9 |
```

```
 10 REM >GEOGDT3
 20 REM PLOTTER PROGRAM FOR DXY-1200
 30 REM 1 PLOT FOR EACH QUESTION
 40 REM by R.T.POET
 50 REM (c) The Micro User
 60 Q$="WHAT IS THE DATAFILE NAME"
 70 PRINT Q$;:INPUT "",datafile$
 80 fileref= OPENIN datafile$
 90 INPUT#  fileref, number
100 INPUT#  fileref, areas
110 barsize = 9000/areas
120 DIM question$(number)
130 DIM ans(number,areas)
140 FOR question = 1 TO number
150 INPUT# fileref,question$(question)
160 FOR area = 1 TO areas
170 INPUT# fileref,ans(question,area)
180 NEXT area
190 NEXT question
200 CLOSE# fileref
210 D$="Data from datafile "
220 PRINT D$;datafile$
230 FOR question = 1 TO number
240 REM Check paper / pen / speed:-
250 REPEAT
260 INPUT "Paper ready? (Y)",B$
270 UNTIL ((B$="Y") OR (B$="y"))
280 REPEAT
290 INPUT"WHICH PEN? (1 to 8) ", pen
300 UNTIL ((pen<9) AND (pen>0))
310 REPEAT
320 INPUT "SPEED? (1to 42) ",speed
330 UNTIL((speed<43)AND(speed>0))
340 VDU 2:REM TURN ON OUTPUT
350 PRINT"IN;SP";pen;";VS";speed;";"
360 REM SET TEXT TERMINATOR (DEFAULT)
370 PRINT "DT":VDU1,3
380 REM ADJUST FOR A4 PAPER
390 PRINT "IP1000,0,6000,5000;"
400 REM PLOT VALUE RANGE 10000:-
410 PRINT "SC0,10000,0,10000;"
420 PRINT "PU;PA2000,9500;"
430 PRINT "SR3,3;"
440 Q$=question$(question)
450 PRINT "DI1,0;LB";Q$:VDU1,3
460 PRINT "DI1,0;"
470 PRINT "SR1,1;"
480 PRINT "PU;PA250,3500"
490 PRINT "SR1.5,1.5;"
500 L1$="ENVIRONMENTAL QUALITY"
510 PRINT "DI0,1;LB";L1$:VDU1,3
520 PRINT "PU;PA750,3500"
530 L2$=" CLASSIFICATION SCORE"
540 PRINT "DI0,1;LB";L2$:VDU1,3
550 PRINT "SR1,1;"
560 PRINT "DI1,0;"
570 PRINT "PU;PA0,2900"
580 PRINT "SR2,2;"
590 PRINT "LB0%":VDU1,3
600 PRINT "SR1,1;"
610 PRINT "PU;PA0,8900"
620 PRINT "SR2,2;"
630 PRINT "LB100":VDU1,3
640 PRINT "SR1,1;"
650 PRINT "PA;"
660 PRINT "PU1000,9000;"
670 PRINT "PD1000,3000;"
680 X=1000+barsize*areas
690 PRINT "PD";STR$(X)",3000;"
700 FOR area = 1 TO areas
710 X=1000+barsize*(area-1)
720 Y=3000+(60*ans(question,area))
730 PRINT "PU";STR$(X);",3000;"
740 PRINT "PD";STR$(X);",";STR$(Y);";"
750 X=1000+barsize*(area)
760 PRINT "PD";STR$(X);",";STR$(Y);";"
770 PRINT "PD";STR$(X);",3000;"
780 X0=1000 +barsize/2
790 X=X0++barsize*(area-1)
800 PRINT "PU";STR$(X);",500;"
810 PRINT "SR2,2;"
820 PRINT "DI0,1;LB AREA ";
830 PRINTSTR$(area):VDU1,3
840 PRINT "SR1,1;"
850 PRINT "DI1,0;"
860 NEXT area
870 PRINT "SP0;":VDU 3
880 NEXT question
890 VDU 3
900 END
```

Get it right ✓

```
 10 =    0 0  | 160 = A800 D | 310 = BFBA 3 | 460 = FF33 9 | 610 = D2FE D | 760 =  9B0 5
 20 =    0 0  | 170 = A7AA E | 320 = 44C5 2 | 470 = 3F1A D | 620 = 8898 0 | 770 = A6E7 6
 30 =    0 0  | 180 = DC99 7 | 330 = 1275 F | 480 = 6B47 1 | 630 = 1164 F | 780 = DA1F 2
 40 =    0 0  | 190 = 7EB2 F | 340 = 222C B | 490 = 6C86 9 | 640 = 3F1A E | 790 = E72D 6
 50 =    0 0  | 200 = EA14 6 | 350 = AFB1 1 | 500 = 3777 8 | 650 = 6C2F 7 | 800 = 57C7 6
 60 = 59A7 7  | 210 = CD2F 9 | 360 =    0 1 | 510 = BE7C 5 | 660 = 4CFA 6 | 810 = 8898 7
 70 = F6E9 1  | 220 = FD37 2 | 370 = 7329 4 | 520 = 1C8B 1 | 670 = FEDD 7 | 820 = 3F81 B
 80 = BB35 F  | 230 = FD21 5 | 380 =    0 4 | 530 = 5476 0 | 680 = E595 4 | 830 = BC56 7
 90 = 457D B  | 240 =    0 5 | 390 = ADD5 D | 540 = 66FE 4 | 690 = 1D54 B | 840 = 3F1A 1
100 = 185F 9  | 250 = BFBA 4 | 400 =    0 D | 550 = 3F1A F | 700 = A800 B | 850 = FF33 4
110 = 8A41 1  | 260 = 90E1 4 | 410 = E511 6 | 560 = FF33 1 | 710 =  68B 0 | 860 = DC99 E
120 = 30E9 9  | 270 = EF8C 5 | 420 = 64EA A | 570 = 9450 8 | 720 = 887A A | 870 = BB9E 2
130 = 8635 3  | 280 = BFBA E | 430 = 15F9 B | 580 = 8898 1 | 730 = 2DC9 F | 880 = 7EB2 B
140 = FD21 C  | 290 = 55CA 1 | 440 = 1D67 F | 590 = BBD3 D | 740 =  9B0 8 | 890 = 8CD6 5
150 = 28C0 4  | 300 = C1FA 8 | 450 = 98DA A | 600 = 3F1A 0 | 750 = B6E1 9 | 900 = FD2E B
```

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SING A
AN

Rafael Jay samples snappy

THE concept of sampled sound – converting sound waves to numbers in a computer's memory, and vice versa – is not a new one, but it is an area which all 8-bit computers, including the BBC Micro, have largely missed out on, simply because of lack of memory.

Sampling at the lowest sensible rate of 5.5 KHz, or 5500 samples per second, about six seconds of sound can be squeezed into 32k.

It isn't difficult to see from this why there are no commercial sound sampling units on the BBC Micro market – after all, who's going to pay £40 or more for six seconds of relatively poor quality sample?

However, all is not lost. One 16-bit computer – the Atari ST – happens to have the same sound chip as the BBC Micro so samples taken on that computer can be easily converted to run on our machines.

First of all, you need to find a friendly ST owner who'll let you use his or her machine. If there's a sampling unit too, so much the better, as this allows you to record your own sequences and edit existing ones with ease.

However, sampled sound is widely available from ST public domain libraries, usually as part of some demo or other.

The samples you use must be 8 bit, that is, sampled at a resolution of eight bits, but as the vast majority of samples available are there's no need to worry.

If you're taking your own samples, make sure you limit yourself to a size that the BBC Micro can cope with. Sampling at 5.5kHz, a standard 32k machine can take approximately 52k of data compressed by the logarithmic converter program accompanying this article, increasing by 32k for each bank of sideways ram present.

Replay VIII, the ST sampling package that I use, has a squeeze option, which halves the size of the sample, thereby doubling the size of original sample I can take. Obviously, if the package you're using has such an option, use it.

Another point to take into account is that on the ST you listen to the sound through at least a monitor speaker, which can cope with the low frequencies – bass – much better than the BBC Micro's tinny little speaker. So samples with lots of bass will not convert very well. This can be rectified to a certain extent by boosting the treble or cutting out some of the low frequencies, but the best remedy is simply to avoid bass-intensive samples.

Also the quality of sample achieved by connecting up the sampling unit directly to a tape or CD player is much higher than with a microphone.

Once you've got the ST end of things fixed up, the next step is to transfer the sample data to your BBC Micro.

There are several ways of doing this: I use an Archimedes with external 5.25in drive and two separate programs to read ST discs and write Acorn DFS format discs.

If you prefer, however, you could link the two computers with a null-modem cable, and transfer the sample data directly, or you could even use a bulletin board as an intermediary.

Incidentally, most ST sampled sound can be converted to run with the Armadeus package – produced by Clares – on the Archimedes, simply by loading in the sample and performing a "signed" conversion.

Conversely, samples taken with Armadeus can be converted to BBC Micro/ST format with the same operation.

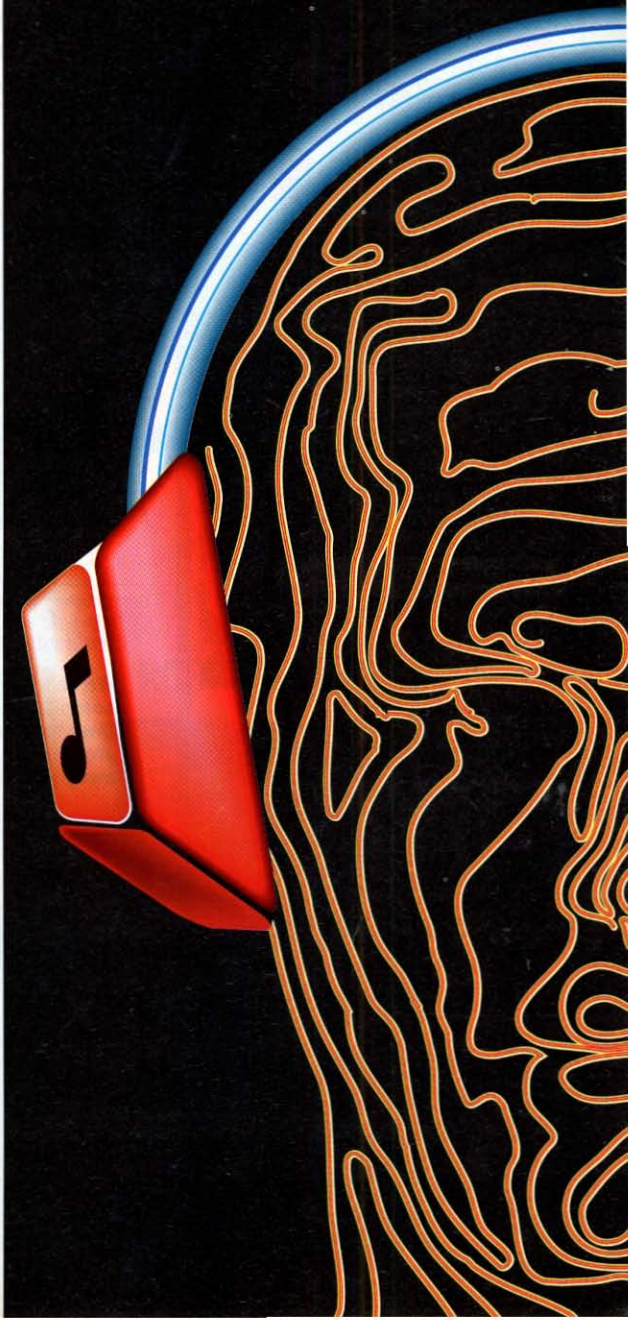
If you have access to Armadeus this is a more straightforward route to obtaining sampled sound for your BBC Micro, although Archimedes sampling is much less widespread than on the ST, and the latter is therefore a better source of material for most people.

One useful thing to know at this stage of the operation is that ST discs are close enough to PC format that they can be understood by any PC disc reader, of which there are many. DFS disc readers are also readily available from various sources.

Also worth noting are Econet networks, which can be used to transfer the data between Archimedes and BBC Micro, if you cannot find an external 5.25in drive.

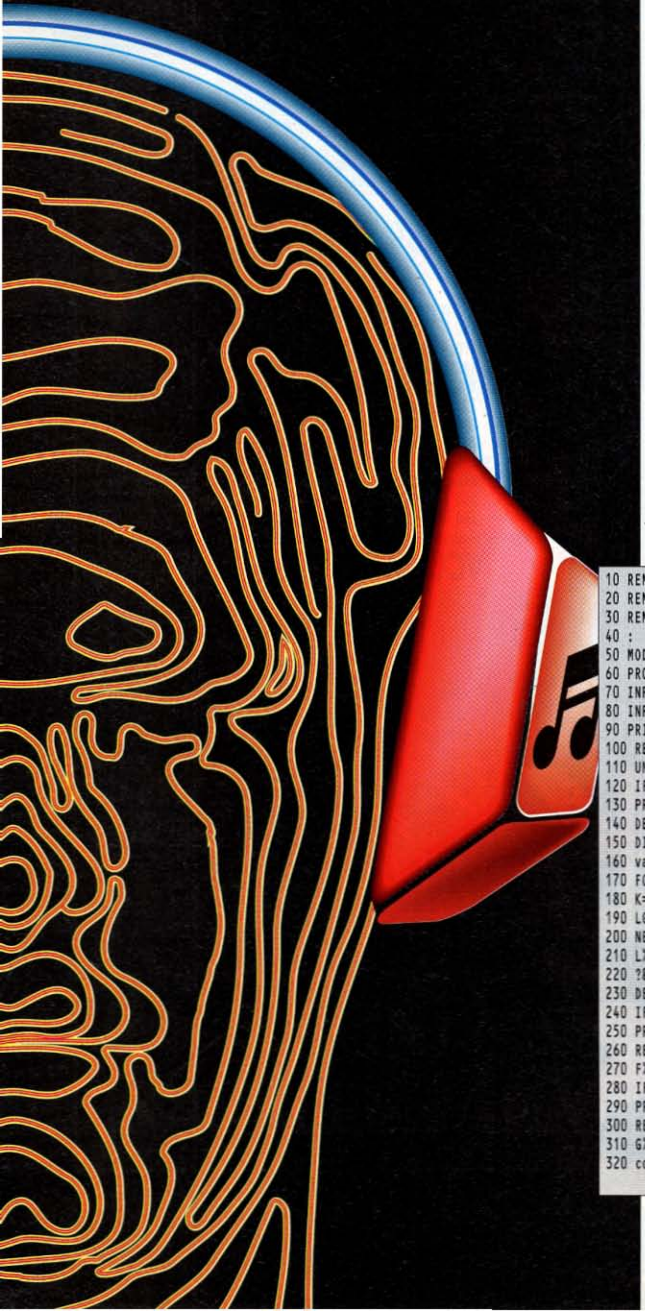
OK, so you've got the sample data on a DFS format disc. What now? Well, before you can listen to it, it needs to be converted to logarithmic format.

Essentially this means translating the numbers that the sampling unit produced into numbers which the logarithmic sound chip in your BBC Micro can understand. On



ALONG ST

sounds on his BBC Micro



the ST, this is almost always done in real time as the sample is played, but although that could be done on our machine, logarithmic conversion also has the happy side-effect of reducing the sample size by half.

And that's an opportunity too good to miss on the memory-starved BBC Micro. Listing I takes care of the process.

I have been investigating further methods of compression, but the techniques tested so far either result in an insignificant size reduction or an unacceptable loss of sample quality.

Still, on a Master, or Model B/B+ with four banks of sideways ram, you can fit just over a minute of sound – more if you use shadow ram – provided it has been taken at 5.5kHz, then cut in half and run through the logarithmic conversion program.

Even a standard 32k micro can hold about 20 seconds, a vast improvement over the original six.

Returning to the program, on running it you are first prompted for the filename of the original sample data, and the filename to use for the converted data.

Enter these, including any drive numbers or directory specifications. If the original sample is very large, you may need to convert between discs, and the program offers you this option.

Once the formalities have been completed, the disc drive starts chugging away, loading up the data in 20k chunks, converting it to 10k of logarithmic data, then saving it.

After each block has been saved the program will inform you how many *k* have been converted, and what percentage of the total it is. Don't worry if it exceeds 100 per cent after the last block has been converted – this is just because the program counts in 20k units, rather than fiddling around with exact numbers.

Once the sample has been converted, you are ready to listen to it. Listing II performs this function. Type the program in, save it, assemble it, and then set the variables *A%* to the playback speed, between 1 and 255, *X%* to the start of the sample in memory – to the nearest page – and *Y%* to the end of the sample in memory. Press f0 or type CALLplay, and the sample will play.

There are a couple of short samples on the subscription disc, demonstrating the possibilities of porting sound between machines in this way.

```
10 REM Logarithmic Conversion
20 REM By Rafael Jay
30 REM (C) The Micro User
40 :
50 MODE7:VDU23;8202;0;0;0;
60 PROCinit_logs:PROCassem
70 INPUT'"Source filename: "S$
80 INPUT"Target filename: "T$
90 PRINT"Swap discs (Y/N)? ";
100 REPEAT:G%=GET
110 UNTILG%=ASC"Y"ORG%=ASC"N":VDUG%
120 IFG%=ASC"Y" SW%=-1 ELSE SW%=0
130 PROCconv(S$,T$):END
140 DEFPROCinit_logs
150 DIM LG%(255)
160 var=15/LOG(255)
170 FOR N%=1 TO 255
180 K=15-INT(LOG(N%)*var)
190 LG%(N%)=K
200 NEXT:FORL%=0TO255
210 L%?&A00=LG%(L%):NEXT
220 ?&A00=&0F:ENDPROC
230 DEFPROCconv(O$,N$):CLS
240 IFNOTSW% GOTO270
250 PRINTTAB(9,5);"Insert source disc..."
260 REPEATUNTILINKEY-99
270 F%=OPENIN(O$)
280 IFNOTSW% GOTO310
290 PRINTTAB(9,5);"Insert target disc..."
300 REPEATUNTILINKEY-99
310 G%=OPENOUT(N$)
320 count%=0
330 REPEAT:T%=&5000
340 IFNOTSW% GOTO370
350 PRINTTAB(9,5);"Insert source disc..."
360 REPEATUNTILINKEY-99
370 PROCgb(F%,&2500,T%)
380 IFEOF#F% T%=(T%-!&905)
390 PROCc(&2500,T%)
400 IFNOTSW% GOTO430
410 PRINTTAB(9,5);"Insert target disc..."
420 REPEATUNTILINKEY-99
430 PROCpb(G%,&2500,T%/2)
440 count%=count%+1
450 PRINTTAB(3,1);(count%*20);"k ";
460 PRINT"converted
(";INT(((count%*&5000)/EXT#F%)*100);"% of
total)"
470 UNTILEOF#F%
480 CLOSE#0:ENDPROC
490 DEFPROCgb(H%,S%,L%)
500 ?&900=H%:!&901=S%
510 !&905=L%:!&909=PTR#H%
520 A%=&03:X%=&00:Y%=&09:CALL&FFD1
530 ENDPROC
540 DEFPROCpb(H%,S%,L%)
550 !&900=H%:!&901=S%
560 !&905=L%:!&909=PTR#H%
570 A%=&01:X%=&00:Y%=&09:CALL&FFD1
580 ENDPROC
590 DEFPROCc(S%,L%)
600 !&70=S%:!&72=(S%+L%):!&75=S%
610 CALL&C00:ENDPROC
```

➤

```
620 DEFPROCassem
630 FOR PASS=0 TO 2 STEP 2
640 P%=&C00:[OPT PASS
650 .loop LDY#&00
660 LDA(&70),Y
670 TAX:LDA&A00,X:STA&74
680 INY:LDA(&70),Y
690 TAX:LDA&A00,X
700 ASLA:ASLA:ASLA
710 ASLA:CLC:ADC&74
720 LDY#&00:STA(&75),Y
730 INC&75:BNEskip3
740 INC&76:.skip3
750 LDA&70:CLC:ADC#&02:STA&70
760 LDA&71:ADC#&00:STA&71
770 LDA&71:CMP&73:BNEloop
780 LDA&70:CMP&72:BCCloop
790 RTS
800 ]:NEXT
810 ENDPROC
```

Get it right ✓

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 9719 9
 50 = 8B0B D
 60 = 26ED 7
 70 = B712 F
 80 = 450A 9
 90 = 619E 7
100 = 5CFC C
110 = 9908 C
120 = D330 0
130 = AAAB 8
140 = A97E 9
150 = 6310 D
160 = 1DC3 1
170 = C528 7
180 = 7579 B
190 = 33E0 5
200 = C15A 8
210 = 6FE6 9
220 = B526 C
230 = 61FE C
240 = 7374 0
250 = 9A0A C
260 = DD9E B
270 = 1185 4
280 = FF48 D
290 = FB4F 3
300 = DD9E A
310 = 69D2 C
320 =  CFF B
330 = F336 B
340 = 70EF B
350 = 9A0A F
360 = DD9E E
370 = A231 9
380 = 280E 4
390 = 4C84 2
400 = F354 B
410 = FB4F A
420 = DD9E D
430 = 2EBC D
440 = F503 E
450 = D57F 4
460 = 29CE C
470 = 1DF6 E
480 = F1F8 2
490 = BF10 F
500 = 4BFE 5
510 =  316 7
520 = EC53 F
530 = ED0F B
540 = 800B F
550 = B0A3 7
560 =  316 A
570 = 37E3 E
580 = ED0F 1
590 = 2964 C
600 = B484 D
610 = 4905 6
620 = 1330 D
630 = C046 3
640 = 8806 C
650 = 5106 5
660 = 7530 F
670 = 38FB 7
680 = 1FD3 9
690 = 19D3 1
700 = EF8B 0
710 = B221 C
720 = F83B 3
730 = 3A6A E
740 = 8C7E 3
750 = A694 2
760 = F5F2 2
770 =  E24 2
780 = CEE5 8
790 = 9843 A
800 = DA42 F
810 = ED0F
```

```
 10 REM STplay version 1.60
 20 REM By Rafael Jay
 30 REM (C) The Micro User
 40 :
 50 *KEY 0 CALLplay|M
 60 FOR PASS=0 TO 2 STEP 2
 70 P%=&900:[OPT PASS
 80 .play_s SEI:JSRinit
 90 LDA#&0F:STA&72
100 LDA#&00:STA&70
110 LDA&75:STA&71
120 .loop1 LDY#&00
130 .loop2
140 LDA(&70),Y:PHA:AND#&0F
150 JSRsound1:PLA:AND#&F0
160 LSRA:LSRA:LSRA:LSRA
170 JSRsound1:INY
180 BNEloop2:INC&71
190 LDA&71:CMP&76:BNEloop1
200 LDA#&0F:JSRsound1
210 CLI:RTS
220 .init LDA#&FF:STA&FE43
230 LDA#&84:JSRsound
240 LDA#&00:JSRsound
250 LDA#&A4:JSRsound
260 LDA#&00:JSRsound
270 LDA#&C4:JSRsound
280 LDA#&00:JSRsound
290 RTS
300 .sound STA&FE4F
310 LDX#&00:STX&FE40
320 NOP:NOP:NOP:NOP:NOP:NOP
330 LDX#&08:STX&FE40:RTS
340 .sound1
350 ORA#&90:JSRsound
360 ORA#&20:JSRsound
370 EOR#&60:JSRsound
380 LDX&74:.loop3
390 DEX:BNEloop3:RTS
400 .play
410 STA&74:STX&75:STY&76
420 JMPplay_s
430 ]:NEXT
```

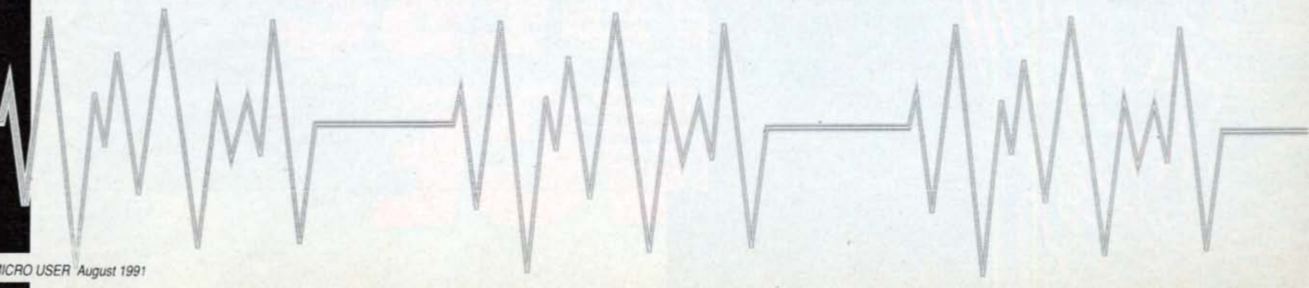
Get it right ✓

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 9719 9
 50 = 26D7 B
 60 = C046 3
 70 = 6896 D
 80 = 3B6B 3
 90 = 88CC B
100 = 9849 4
110 =  7EB 5
120 = 8F91 1
130 =  372 F
140 = 6F34 B
150 = F3C6 B
160 = 2D50 E
170 = 2FE0 9
180 = 24DD 9
190 = 21CC E
200 =  2CC 4
210 =  188 B
220 = 9630 F
230 = DA4E E
240 = D5F5 6
250 = 1B1B 5
260 = D5F5 1
270 = BBA8 0
280 = D5F5 F
290 = 9843 D
300 = CD24 9
310 = B40F 7
320 = 352D 9
330 = 207B 2
340 = 34E1 F
350 = CC56 9
360 = 1622 3
370 = 79A7 0
380 = C8EF 8
390 = 88AC 2
400 = BCC6 0
410 = 4125 7
420 = 1483 3
430 = DA42 4
```

```
 10 MODE7:VDU23;8202;0;0;0;
 20 *LOAD SAMPLE1 3000
 30 *LOAD SAMPLE2 5D00
 40 PROCassem:PRINT
 50 PRINT"1. 'Your Highness...' sample"
 60 PRINT"2. 'Come on' sample"
 70 REPEAT:G%=GET
 80 IFG%=ASC"1"
A%=20:X%=&30:Y%=&5D:CALLplay:GOTO100
 90 IFG%=ASC"2"
A%=10:X%=&5D:Y%=&66:CALLplay:GOTO100
100 UNTILFALSE:END
110 DEFPROCassem
120 FOR PASS=0 TO 2 STEP 2
130 P%=&900:[OPT PASS
140 .play_s SEI:JSRinit
150 LDA#&0F:STA&72
160 LDA#&00:STA&70
170 LDA&75:STA&71
180 .loop1 LDY#&00
190 .loop2
200 LDA(&70),Y:PHA:AND#&0F
210 JSRsound1:PLA:AND#&F0
220 LSRA:LSRA:LSRA:LSRA
230 JSRsound1:INY
240 BNEloop2:INC&71
250 LDA&71:CMP&76:BNEloop1
260 LDA#&0F:JSRsound1
270 CLI:RTS
280 .init LDA#&FF:STA&FE43
290 LDA#&84:JSRsound
300 LDA#&00:JSRsound
310 LDA#&A4:JSRsound
320 LDA#&00:JSRsound
330 LDA#&C4:JSRsound
340 LDA#&00:JSRsound
350 RTS
360 .sound STA&FE4F
370 LDX#&00:STX&FE40
380 NOP:NOP:NOP:NOP:NOP:NOP
390 LDX#&08:STX&FE40:RTS
400 .sound1
410 ORA#&90:JSRsound
420 ORA#&20:JSRsound
430 EOR#&60:JSRsound
440 LDX&74:.loop3
450 DEX:BNEloop3:RTS
460 .play
470 STA&74:STX&75:STY&76
480 JMPplay_s
490 ]:NEXT
500 ENDPROC
```

Get it right ✓

```
 10 = 8B0B B
 20 = 272D 9
 30 = CA9C 5
 40 = 98B5 4
 50 = A72B 5
 60 = 4C70 3
 70 = 5CFC 0
 80 = 9935 2
 90 = 2C8C 7
100 = 5577 0
110 = 1330 7
120 = C046 2
130 = 6896 1
140 = 3B6B 7
150 = 88CC C
160 = 9849 4
170 =  7EB D
180 = 8F91 4
190 =  372 6
200 = 6F34 C
210 = F3C6 7
220 = 2D50 5
230 = 2FE0 8
240 = 24DD 4
250 = 21CC C
260 =  2CC C
270 =  188 0
280 = 9630 A
290 = DA4E 6
300 = D5F5 0
310 = 1B1B 3
320 = D5F5 5
330 = BBA8 8
340 = D5F5 8
350 = 9843 D
360 = CD24 0
370 = B40F 8
380 = 352D 5
390 = 207B 5
400 = 34E1 7
410 = CC56 2
420 = 1622 5
430 = 79A7 5
440 = C8EF D
450 = 88AC 2
460 = BCC6 9
470 = 4125 3
480 = 1483 5
490 = DA42 2
500 = ED0F C
```



Take the plunge

Teri Paul takes you on a whirlwind tour of the best of summer PD '91

ORIGINAL SoundTracker tunes – or the lack of them – are something I've mentioned from time to time and I've had a couple of letters about it.

One in particular came from Daniel Wilson AKA BrokenARM Music. He agrees with me and some of his music is available in the PD and can be obtained from The World of Cryton BBS or from The Serial Port but unfortunately for PD collectors his most recent work is only available on a commercial basis.

However, some nice new SoundTracker tunes have turned up and will be available on next month's subscription disc, in particular some new sound tracker files from Ozone Friendly PD. Added to which is a program called Jukebox with a couple of new sounds from Equinox PD and Arch PD.

It's a funny old world

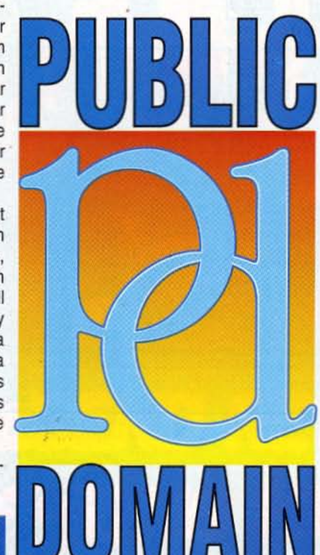
Do you like frogs? I do, so I was intrigued by a BBC Micro game called Froggy from Frank Dudley of The PD Magazine (nee Procrastinet). A huge green frog fills the screen and you must guide its tongue to catch 30 flies in a minute.

However, the game does have a somewhat unfinished feel about it as the fly sprites are not up to the frog's quality and there is no way of telling when your minute is up – the fly counter just returns to zero, but you don't stop playing.

If you like playing games on the quiet then here's a couple of new ones, from Lee McGinty. Maze is played on your icon bar after setting the size and difficulty level. As you would assume you have to find your way out of a maze using the mouse. The green dot which you have to guide moves rather smartish and there is a tendency to get stuck in the corners – however, you'll find it curiously addictive.

In the same genre and from the same programmer come Racer and Shoot Em 'Up. Both sit on your icon bar and you use your mouse to race along a track or play space invaders.

They are not for those with bad sight though, and even with good eyes you'll find the tiny sprites a bit of a strain after a while. This is perhaps just as well as they are quite addictive.



Lee's programs are excellent, so get hold of them while you can, he might not stay in the public domain much longer.

There are also some new games around from Martin Dunn. SuperSkate is very simple – jump over the breaks in the wall and watch out for hazardous balls.

The DiceGame is again very simple in concept and reminded me a little of Yahtzee.

Basically you roll the dice and specific combinations earn you from 20p to £2. You start with £5 to gamble with.

As you couldn't choose to stick with certain dice results and only roll one to three of the others it was too much dependant on luck for my liking.

Surrounded was very similar to an old magazine listing – this time though you must guide a little creature around the screen, not crossing over your own trail or bumping into the obstacles.

Wizards is similarly familiar: Here you eat the cherries scattered on the screen before the yellow monster devours you. A nice touch is that this monster is seemingly intelligent as it both follows you and waits by the remaining food – but perhaps that is just my natural paranoia showing through.

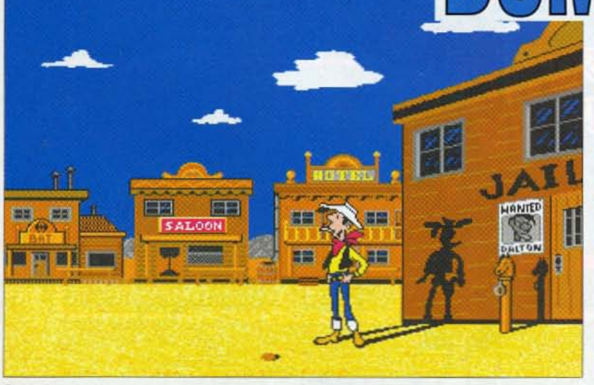
If adventure is more your forte you'll be familiar with the text systems of Quill and ALPS. I came across some new ones on the Red Shift BBC Micro list – Dreadnaught and First Contact from Philip Hawthorne (who wrote the ALPS system) and Insomnia from Ian Hudson. The latter is perhaps the most original plot line of the three, but I do like wandering around abandoned and alien-ridden spaceships. I also appreciate the weird and wonderful Greenfinger available from BBC PD. An adventure game set in a Looking Glass-style world, it's well worth a dabble.

DeskTop's lure

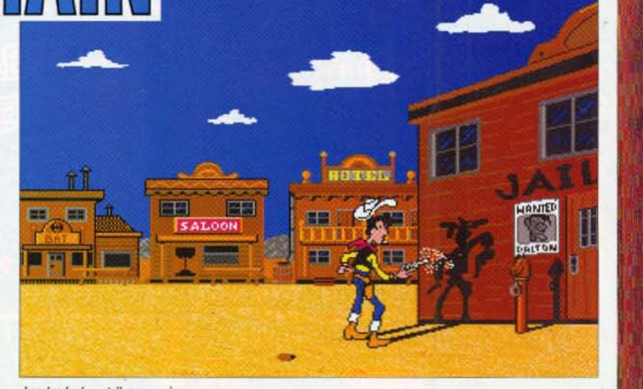
Yes, I have to admit it: I'm a DeskTop junkie and I'm hooked. Not only do I have a vast array of bits and pieces crowded on to my hard disc but the icon bar on my Archimedes looks like a convention. Latest addition is Dancer courtesy of Lee McGinty. A little stick man – reminiscent of the Simon Templar logo for any oldies out there – lies inert on your icon bar, but choose a dance style for him and watch him boogie.

Lee has provided three styles so

➤



Behind you!



Lucky Luke strikes again

far: Prince, Breakdance and the Stonk. Add your own music and gyrations as you see fit.

Sounds Familiar

BBC Micro owners should look out for the Mad Rabbit sound sample for something a little different and Depeche Mode lovers can hear the tune and read the words to A New Life on a nice piece of musicality from BBC PD.

Cream PD is a new PD library set up solely for Archimedes music lovers. With more than 150 SoundTrackers available you choose which ones to fill your disc with – sounds interesting

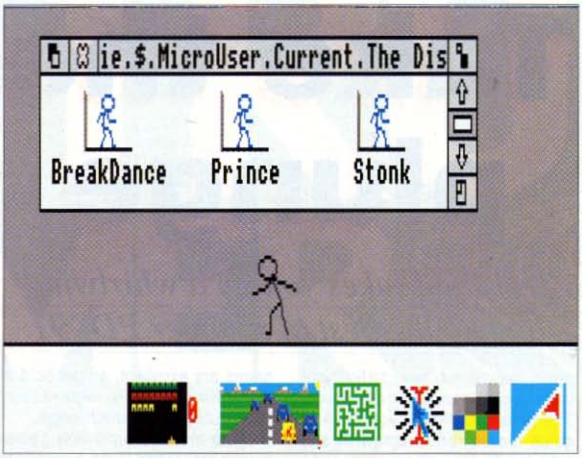
Archimedes Update

Translator is now in version 6.36. For the arty or DTP enthusiast, Translator is a super tool which converts and processes image files including formats such as GIF, TIFF – greyscale, colour and RGB – as well as ILBM IFF and Degas PL1/PC1 formats peculiar to the Amiga and Atari ST respectively, as well as MacPaint, Sun, Windows 3 plus a variety of other formats.

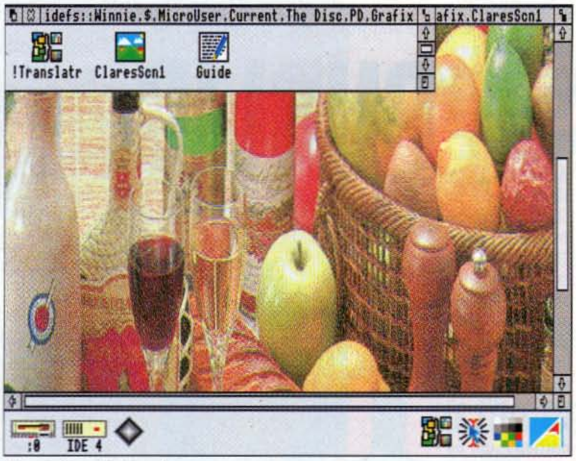
One of the nicest things about this utility is the comprehensive manual which is easy to read.

Whoops!

Somebody sent us two programs from Risc User as public domain – they aren't. Apologies to Risc User for putting them on our disc. When we get hold of that person...



Boogie on down, brother



The new Translator in action

Useful utilities

A very nice printing utility, !OnePrint, wended its way on to my Archimedes this month from Ivoryash – better known for its commercial Multitasking Serial Link and Teletext software.

Now if you can't be bothered to load your word processor to make a couple of notes, you can load OnePrint. When you double-click this utility a text window appears as does one to control your printer's style and so on.

The program is set up for three printers already but you can add more by accessing the Basic source code.

Staying with DTP but moving to the Beeb, a number of clip art files are available for the AMX PageMaker/Stop Press. Do be careful with clip art though as some seemingly harmless pieces are copyrighted – if in doubt don't use them for commercial purposes.

Some extremely pretty demos areavailable for the BBC Micro at present. But do remember to tell the libraries what Beeb you have access too as not all of these demos will work on all machines. Roly Poly Pudding is one of several IBM pictures now available for double-sided drives or on single sided double density discs.

PD libraries

Do remember to always send an SAE when you write to any of the PD libraries – they can keep their costs down only if you help too.

Arch PD - Archi
190 Ferry Road
Hullbridge
Hockley
Essex
SS5 6EL

BBC PD - BBC
18 Carlton Close
Blackrod
Bolton
BL6 5DL

RE Clark PD Library - Archi
Westbourne House
34 Bradley Street
Wooton-under-Edge
GL12 7AR

Cream PD - Archi
38 Baunton
Cirecenster
Gloucestershire
GL7 7BB

Cotswold PD - BBC
Maycombe
Field Road
Whiteshill
Stroud
Gloucestershire
GL6 6AG

Equinox PD - Archi
27 Station Road
Earls Barton
Northampton
NN6 0NT

Mad Rabbit PD - BBC
22 Oakwood Grove
Horbury
Near Wakefield
West Yorkshire
WF4 5JE

Moribund Hedgehog
3 Rodmell Close
Bromley Cross
Bolton
BL7 9DT

Ozone Friendly - Archi
180 Cumnor Hill
Oxford
OX2 9PJ

Robert Pike
4 Mayfield Road
Girton
Cambridgeshire
CB3 0PH

PD Magazine - BBC
Computing Department
Ludlow 6th Form College
Mill Street
Ludlow
Shropshire
SY8 1BE

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There's mounting alarm about the appalling standards of spelling among Britain's schoolchildren. MPs, teachers, parents and employers are all stressing the vital importance of being able to spell correctly.

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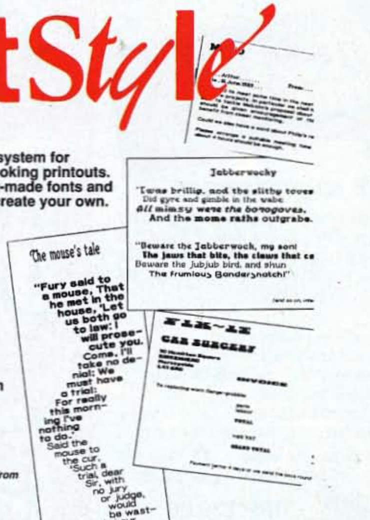
- ***OVER 5,000 WORDS***
- ***FOR AGES 5 TO 15***

SPELL! only costs £8.95. It is now available on disc and tape for six of the most popular home computers.

PLEASE USE THE ORDER FORM ON PAGE 112

FontStyle



The mouse's tale

"Fury said to a mouse, That he met in the house, 'Let us both go to law: I will prosecute you. Come, I'll take no denial: We must have a trial: For really this morning I've nothing to do.' Said the mouse to the cur, 'Such a trial, dear Sir, with no jury or judge, would be wasting our breath.'

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that c
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

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- *Temporary or hanging indents*
- *Dynamic control over page layout*
- *Flexible and easy-to-use font designer*
- *Ideal for letterheads, invoices, newsletters, memos and so on*
- *All popular word processors supported*

FontStyle	
5.25in disc	£9.95
3.5in disc (BBC ADFS)	£10.95
Archimedes (Using emulator)	£11.95

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5.25in disc	£14.95
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DTP

This is an easy-to-use and flexible page design system for producing high-quality printouts through your Epson compatible printer. It comes with four of its own fonts to get you started plus a Font Designer to keep you going.

Some of the features of Database Publications DTP

- Independent control of bold, italic, 'thin' and underline characteristics of the system font
- Proportional spacing of both external and system fonts
- Stretching and compressing of any area
- Pixel editing via zoom facility
- Up to A5 page design
- No special disc format
- Four fonts provided
- Font Designer supplied
- Built-in Graphic designer
- Import text or type direct
- Can import cut-outs
- Built-in Mode converter

Database Publications' DTP

5.25in DFS 40/80 track disc (only) £14.95

Due to the complexity of the program the fill routines will not function correctly with the B+, Master or Compact – all other features are compatible

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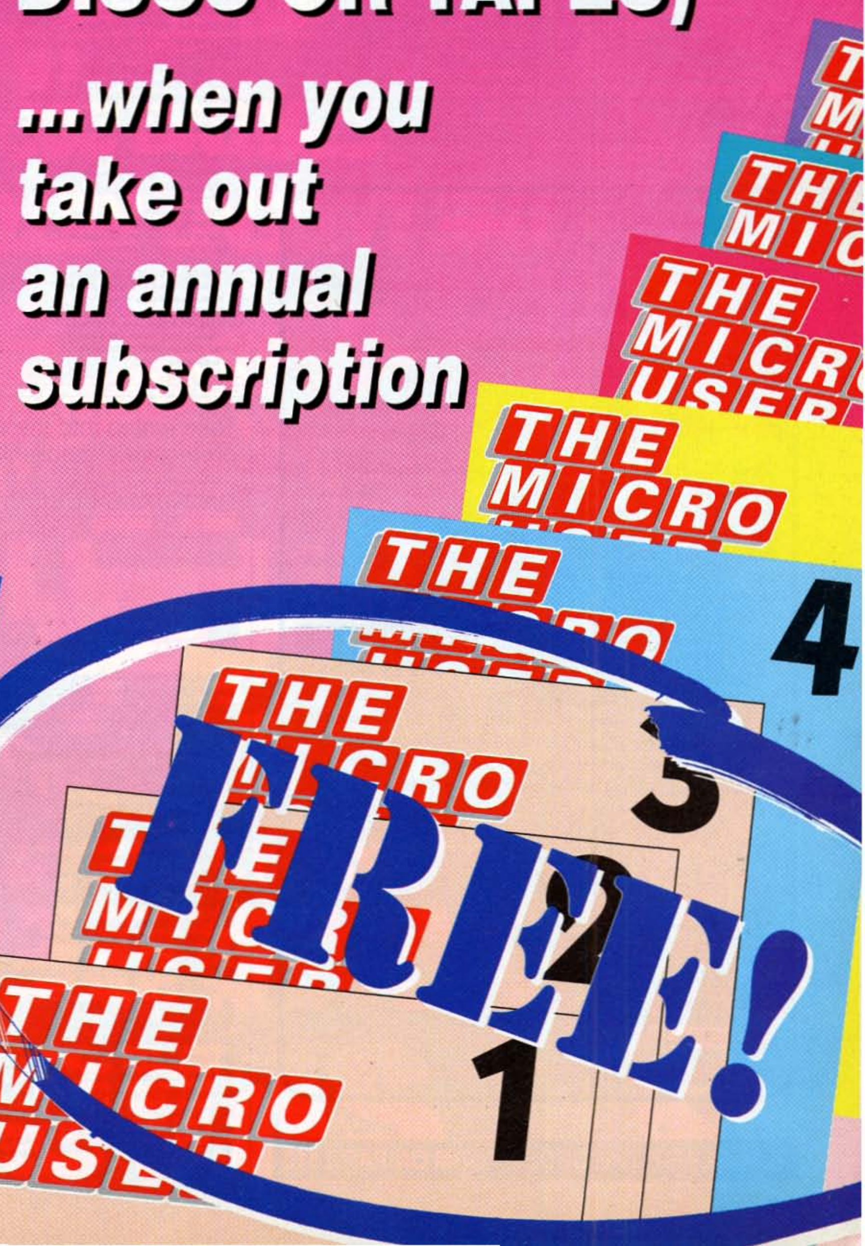

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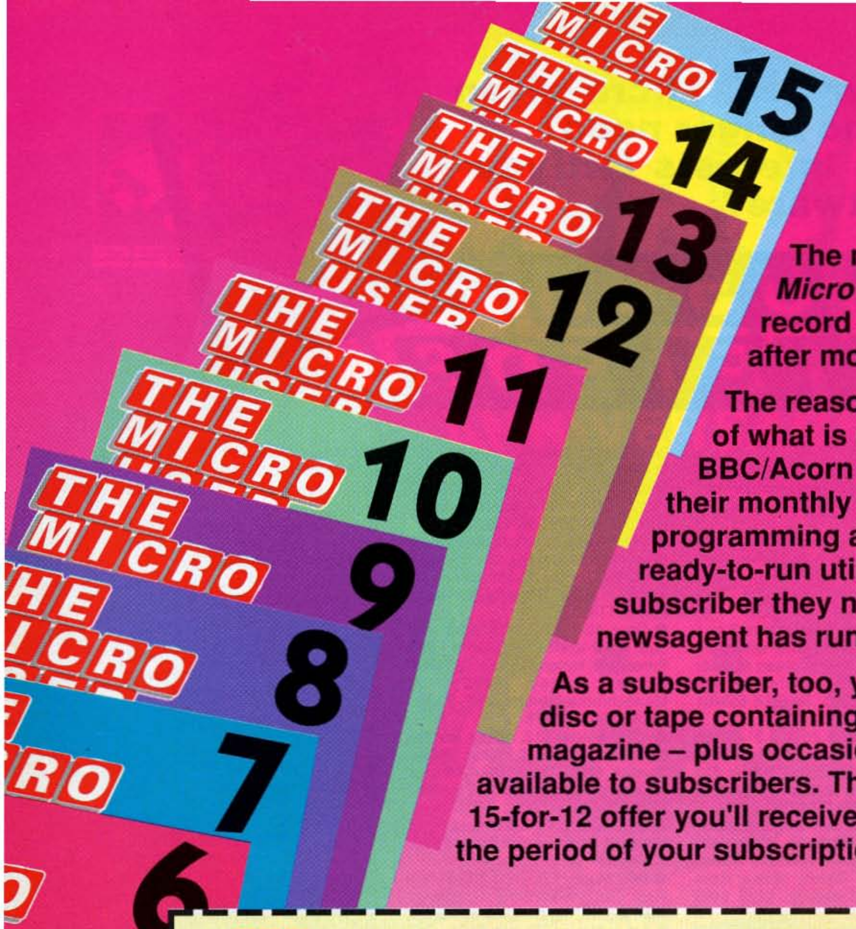

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PRIZE letter

Echoes of Elite

IT'S nice to see you're repeating the listing of Elite Cheat again in the magazine. At the time it really opened up the entire game for me – I was only 11 at the time.

Anyway since then I've bought UIM for the Archimedes and found the distances involved in it very frustrating. Every mission requires you to travel across the network twice making a grand total of 512 very long journeys. You can relieve the boredom by buying an ocean drive, but this is a very expensive option.

So with the memories of Elite re-kindled in my memory I wrote the following short program. Like Elite Cheat, is works by altering the data file for a saved game.

It's very simple and only allows you to alter the amount of cash you have. However, this will enable you afford any piece of equipment you want. Unfortunately my version only works for the Archimedes and not on a BBC or Master. – **David Radford, Bolton, Lancashire.**

● If only making money in real life was so easy.

```
10 REM UIMCheat
20 REM By David Radford
30 DIM C% &400
40 INPUT "Filename : "F$
50 OSCLI("LOAD "+F$+CHR$32+S
TR$~C%)
60 INPUT "Cash: "!C%
70 IF !C%>65000 !C%=65000
80 REM correct CRC
90 V%=0
100 FOR A%=C% TO C%=&22C STE
P 4
110 V%=V% EOR !A%
120 FOR B%=1 TO 32
130 D%=V% AND (1<<31)
140 IF D% THEN V%=V% EOR &10
80
150 V%=V%+V% (D%>31)
160 NEXT
170 NEXT
180 C%!&230=V%
190 OSCLI("SAVE "+F$+CHR$32+
STR$~C%+" +400")
```

Masters at CAD

CAN you recommend a good CAD program for the Master? I'm a music teacher and want very much to print my own teaching and quiz programs for my pupils.

The package must be able to draw ellipses and fill them with a variety of colours as well as coping with common musical notation. Ideally it should also be able to include text in the screen picture and save and load the pictures into any quiz or teaching program. – **C. R. Hastie, Newcastle-upon-Tyne, Staffordshire.**

● You are going to be hard pressed to find a program to meet your needs exactly. However, there are two which come pretty close – TechnoCAD from Technomatic and Quest Paint from Watford Electronics.

You are really going to have problems when it comes to loading and saving files into other quiz and teaching packages.

This depends very much on the packages you are using, but it is unlikely that you'll be able to do this because that level of compatibility doesn't exist on the Master.

Compact user port

OWNING a Master Compact, I recently found I needed a user port. Mertec used to make an upgrade for the Compact that would have provided me with a user port plus some other useful features.

I've been trying unsuccessfully to find somewhere that sells the Mertec adaptor – known as the Compact Companion – but to no avail. Can you help? – **David Lynn, Preston, North Humberside.**

● You have two options: you can contact PRES who might well be able to help you, or if you are feeling a little more adventurous you could follow Mike Cook's advice in his Body Building series. Back in the February issue of *The Micro User* he showed how to convert any serial port into a user port.

New acorns for old

I AM considering buying an Archimedes but feel I need to know a little more about the software that's available. I use a Computer Concepts Mega 3 Rom which contains InterWord, InterSheet and InterChart.

I've read that I can get this software on disc and in rom form. Do these work through the 6502 emulator or are they truly Risc OS? More importantly, how do they compare to the Archimedes equivalent?

I also use PMS Genie Junior. What is an Archimedes equivalent and is it possible to swop data between them?

Finally a question concerning the PC emulator. The version of Dos used is 3.21 and I believe that the latest edition of MSdos is 4.1.

Will there be upgrades to the more recent version of MSdos and will the emulator be able to read discs saved by later versions? – **W. Jackson, Cirencester, Gloscestershire.**

● You can buy the Inter series for the Archimedes but these are not true Risc OS programs and you'd be certainly better off with native ones.

If you want to stay close to what you're used to we suggest Impression for a wordprocessor and DTP package, Squirrel for a database and Schema for a spreadsheet.

There are many chart/graph programs on the market – many in the public domain – and it really depends on what you want to do with it as to which one is best.

There is no version of Genie for the Archimedes, and as the machine is multitasking there is no real need for one. While having one type of document on the screen you can still open an edit file and make notes.

Regarding the other functions of Genie, a whole host of PD is software available to you for a nominal cost – address books, phone lists

➤

Bridging the gap

USING a 440/1 at work and a 420/1 at home I'm interested in using as much of the potential of the Archimedes as I can. I'm a reasonably competent Basic programmer, having written programs for home and work use.

What I want to do know is how to convert my original BBC B programs to the Archimedes to take advantage of the Wimp environment.

I have found the manuals supplied with the computers to be unhelpful. Could you recommend a book which could be of use as an introduction? – **N. Messenger, Eastbourne.**

● Rather that recommending a book, you couldn't go wrong using Archway from Simtron. This truly excellent piece of software is ideal for your purposes as it lets you create Wimp-based programs without you having to understand exactly what you're doing.

However if you really want to get into the nitty gritty of the Arc, you'll need the Programmer's Reference Manual from Acorn as well as the Basic manual.

WANT to write to The Micro User? The address is:

Letters, The Micro User,
Europa House, Adlington Park, Macclesfield SK10 4NP.

Writers of the most interesting letters receive a £10 prize.

and so on. In some ways the choice is too great. Unfortunately though, you will have to reenter your data.

The A3000 in the Learning Curve package comes complete with a PC Emulator. This version uses DRdos, whereas the original used MSdos. There is very little difference and both will read the same PC discs. A new, faster and better emulator is due out soon.

Whichever version of Dos you use, you can still read the same discs.

Adventurous Electron

WE have an Electron with disc drive, joystick and roms using a mono screen and we're having problems finding adventure games on disc or tape.

We'd especially like to have a go at Hampstead from Melbourne House, but can't find their address. Can you help? – **Mrs P.E. Selhi, Llanybyddr, Dyfed.**

● Melbourne House was the adventure label belonging to Mastertronic, who are now part of the Virgin group. Unfortunately they have long severed their connections with Acorn machines.

There are quite a few adventure games out there for you to play and we'd suggest you contact Topologika and PRES and keep an eye on the classified adverts for people selling their old programs.

If anyone out there has a selection of Electron adventures they don't need perhaps they'd like to send them to Mrs Selhi care of *The Micro User* – originals only please.

LOAD !Boot!

AN answer to a letter in the March issue of **The Micro User** *contained the following: "Option one send a *LOAD !Boot command, and anyone who knows a good use for this one might like to let us know".*

There are two answers – one clean and one dirty. When I first started Basic programming I had my option three !Boot file chain a Basic program which set up my favourite set of soft key definitions.

I still do this even though it's possible to save Page &B as !Boot and set the option to one. Strictly speaking, this is more efficient and is the clean answer.

The dirty option is a development of this. Key 10 – Break – is also a soft key. When pressed without Control the last thing the OS does is execute the key 10 definition, if any.

*If the loaded definition is either CHAIN XXX or *XXX the file XXX will be executed so long as it's found. So a LOAD option can introduce a menu just as effectively as RUN or EXEC options.*

I believe the clean option is what the original designers had in mind. – **Ivan Sayer, Rosevears, Tasmania.**

Busting Blocbusta

THANK you for printing my game Blocbusta in the June issue of **The Micro User** *– I even typed it out.*

The use of zy1% and zy2% in the data statements to replace all my GOSUBS was very effective and certainly saves time and typing. Also the addition of a timer on/off option is a nice addition for novices and poor losers.

I suspect that you probably tested this on an Archimedes, as it does run a little slow on the BBC Micro. To improve playability and key response on the Beeb alter TM% and TB% in lines 160 and 170 to values of +3 and +6 respectively – experts can go even lower.

I have found a problem when all the lives are lost and the player returns to the title screen – on pressing the spacebar to restart my BBC Micro hangs up.

The only way out is by pressing Escape, which means that you lose any new high scores. The BBC Micro solution is easy, alter line 570 to read:

```
570 VDU22,5,4:PRINTTAB(6,2)
etc
```

Those desperate to get back into the game a little sooner can alter the figures in brackets in line 1970 to a lower number. – **Donald Ross, Perth, Scotland.**

ALL programs printed in this magazine are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost cretainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigatedwithout delay, but any replies found necessary will only appear in the letters pages.

Bring on an Amiga

I READ in the April issue that a ZX Spectrum emulator would be soon available for the Archimedes. I had to laugh – why on earth would anyone want to degrade their excellent Archimedes with such a product?

I am an ex-Spectrum owner and can honestly say no Spectrum program would be worthy of the Archimedes. Rather why has no one developed an Amiga emulator, where the games are excellent.

This would remedy the lack of recreational software for the Archimedes. – **Peter Swindells, Swindon, Wiltshire.**

● A substantial number of people do indeed want a Spectrum emulator as they can continue to play the games they know and love even though graphically and musically they are not up to the Archimedes standard. it also provides an upgrade path from the Spectrum as an alternative to the ST and Amiga.

There are definite complications with writing an Amiga emulator. As a lot of the better games are written in C, it is easy to convert them to run on the Archimedes properly rather than under an emulator.

Opting for expansion

HAVING recently bought an A3000 I'm confused about the expansion options. I want to buy a second disc drive soon, but plan to add a sampler and hard disc to my system later on.

I have been told that I need a podule, but what else do I require to add a second drive but with the option for future additional expansion?

I've looked at the PRES housing but I'm not interested as I don't have a monitor and would much prefer to expand using separates. – **J. P. Uphill, Loughborough, Leicestershire.**

● We are not quite sure why you dismiss the PRES system, even if you don't have a monitor you will have a TV or screen of some kind.

You can add separates to your system, but it will be very untidy and potentially unsafe with bits dangling around.

With the PRES unit you can add several expansion cards cleanly with spaces for 3.5in and 5.25in disc drives and a hard disc.

You could opt for an internal 20Mb hard drive such as the one from Ian Copestake and then we feel that you wouldn't really need an additional second drive unless you want to add a 5.25in one to your Archimedes. This would leave your expansion slot free for a future sampler to be added.

Watford Electronics also do an expansion plinth.

Riddle of the rom

*MY son was recently given a rom for his BBC B. On fitting it and typing *HELP we got Database 1.20. We then entered *DATA and received:*

```
DATABASE
(c) Bucon Ltd 1984
DATABASE
DATABASE1-Edit2-Create3-
Report Writer4- Select5-
Utilities6-
mail-merge7-scribe
```

To use this program we need a Database Utilities Disc which he unfortunately wasn't given. From your knowledge of the software available could you identify who to contact? – **Mrs Smith, Cottingham, North Humberside.**

● We do vaguely remember the program you describe, but not where it comes from. All we can suggest is that you keep a close eye on the classifieds – and if any readers think they can help please drop us a line.

Sounding things out

Ian Waugh takes note of a new package in the DIY musical marketplace

Product: !VoiceBuilder
Price: £19.95
Supplier: MJD Software, 13 Bumham Way, London, W13 9YE.
Tel: 081-567 4284
Requirements: BBC A3000 and Archimedes series

AS its name suggests, VoiceBuilder is a DIY sound creation kit. It will run on any Archimedes under Risc OS, multitasks and takes around 200k of workspace. An easy program to use, the instructions are supplied on disc and printed out on just three sheets of A4 paper.

Before you begin you need to understand how a sound is constructed in !VoiceBuilder from three elements – a waveform, an amplitude envelope and a pitch envelope. The parameters for all three appear in !VoiceBuilder's window.

The waveform determines the sound's tone or timbre. Sixteen preselected ones include flute-like, hollow, bright, reedy, metallic and pulsing tones. They were chosen by MJD for the way they respond to the envelopes.

You step through the waveforms by clicking on increment and decrement buttons. Using Select they increment and decrement, as you would expect. Adjust has the opposite effect.

The amplitude envelope determines the way the volume of the sound changes over time. Most synthesiser envelopes have four phases – Attack, Decay, Sustain and Release.

!VoiceBuilder has three phases – Attack, Loop and Release. Again, there are 16 preset envelope shapes but you can alter the Attack, Loop and Release times.

The Attack portion of the sound is the time it takes to reach a certain – usually maximum – volume. Pianos and percussive instruments have very fast attack times, while strings and things you blow have slightly longer ones.

Next comes the Loop phase. Its shape varies from envelope to envelope. Some have a step, some dip in the middle, some rise then fall sharply and some are simply flat. As its name suggests, the Loop phase will repeat as long as the notes is sounding.

When the note has ended – to use a keyboard analogy, when you take your finger off the key – it enters the Release phase. This determines how the volume finally reaches zero. It may drop quickly, slope away slowly or rise and fall until it finally fades away.

The Pitch envelope has its own set of Attack, Loop and Release phases. They work in exactly the same way as those for the amplitude envelope, but naturally enough affect the pitch of the sound rather than its volume.

There is one other parameter, Pitch Span. This is the difference in pitch, in semitones, between the highest and lowest parts of the pitch envelope. Set it to around 0.7 of a semitone for gentle vibrato and use larger settings for laser zaps, sirens and other special effects.

By altering the Pitch Span and the times of the phases you can create a colossal number of voices although the difference between many won't be vast. This is very much a synthesis operation. We aren't dealing with sampled sounds, and the tonal quality is largely set by the waveforms.

You can test a sound by playing the computer keyboard of an attached Midi keyboard if you have an interface.

When you've created a voice you like, name and save it to one of eight libraries which can be saved and loaded separately to disc. One of the library menu options tells you which waveform and envelopes a voice is constructed from.

You can load any voice back into the editor for alteration by dragging it there from the library.

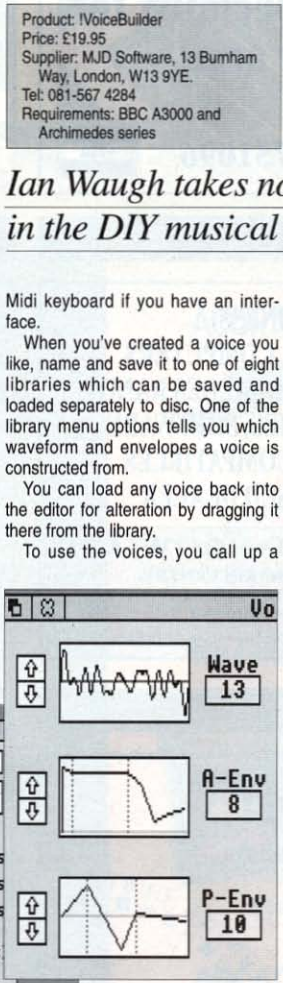
To use the voices, you call up a module window from the !VoiceBuilder icon on the icon bar. Load the required voices – a maximum of eight – into it from any of the libraries and save it to disc. It can then be used like any other sound module.

What's perhaps even more interesting is the fact that !VoiceBuilder has its own internal voice called Note, so you can, for example, create a piece in Rhapsody, set a stave to Note and hear how the voice you're designing sounds in situ.

In fact this is the way I'd recommend you use !VoiceBuilder, as you get a far better impression of the sound when it is used in context.

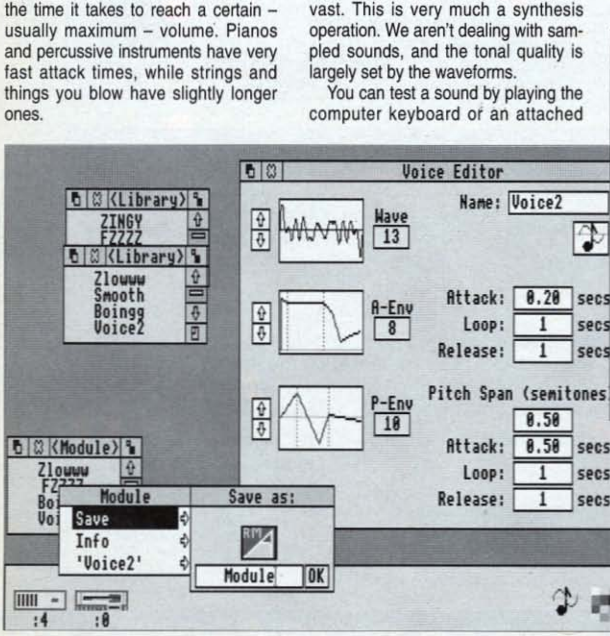
I was a little disappointed to discover that there were no examples of MJD's own handiwork in the way of voices or modules, but MJD assured me that some would be includes in future releases.

All in all this package is for users who want the simplicity of presets but who also want some element of control over the sounds they create. This, of necessity, imposes some sonic limitations, but if you accept that you'll find it very easy to use.



Wave 13
A-Env 8
P-Env 10

Choose your own program



ZINGY
FZZZZ

Zlouww
Smooth
Boingg
Voice2

Name: Voice2
Wave 13
A-Env 8
Attack: 0.20 secs
Loop: 1 secs
Release: 1 secs
P-Env 10
Pitch Span (semitones) 0.50
Attack: 0.50 secs
Loop: 1 secs
Release: 1 secs
Save as: Module

Most of the VoiceBuild functions on display

Summing up

VoiceBuild is not as powerful as MJD's Archimedes Voice Generator but then it's cheaper and a lot easier to use. Ideal for anyone whose synthesis theory is a little rusty – or non-existent – but who still wants to experiment with the creation of their own sounds.

The Micro User gui

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Magic Squares

Jon Millington tots up some crafty totals when it comes to numbers

WHEN every column and both diagonals of a square arrangement of numbers adds up to the same total, you have a magic square.

A 3 x 3 magic square is formed from three sequences with three numbers in each, in such a way that corresponding terms in these sequences make three other sequences.

You can see this from the table below, where the difference between consecutive terms in each row is *H*, while that in each column is *V*.

```
M-H-V   M-V   M+H-V
 M-H     M     M+H
M-H+V   M+V   M+H+V
```

Having entered the two differences *H* and *V* and the middle number, *M*, you will see on the screen the six sequences – three across and three down – that your inputs have created.

Then the micro converts the nine numbers into a magic square by moving the four corner ones in turn three-quarters of the way to their opposite corners. This also rotates the original square through 45 degrees, as shown below.

```
          M-V
     M+H+V   M-H+V
  M-H      M      M+H
     M+H-V   M-H-V
          M+V
```

Since you get the same total from each of the eight three-number lines, the new square is magic and each total will be three times the middle number. For example, M-H, M + H + V and M-V add up to 3M.

All nine numbers in a magic square should be different, but only seven will be if H = 2V or H = -2V, or five if H = V or H = -V. See for yourself what happens when either H or V or both are zero.

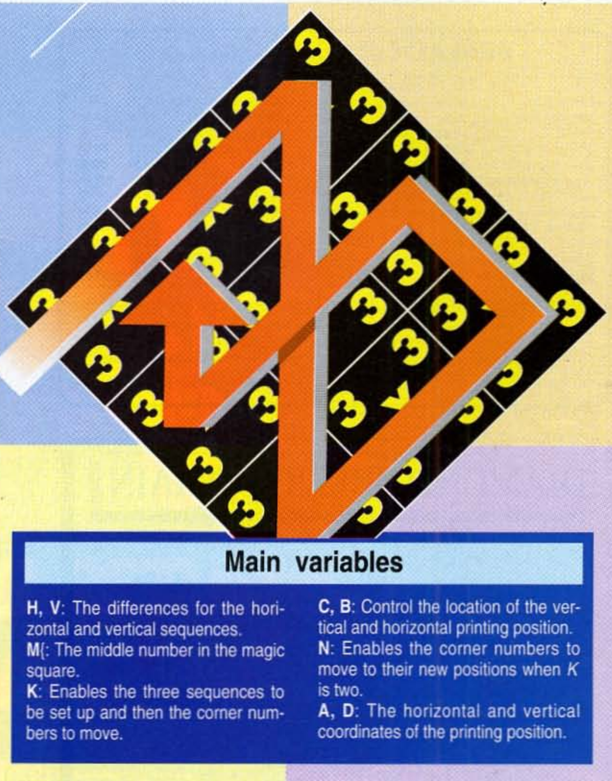
The regular magic square of order three is the simplest possible 3 x 3 magic square. It contains the numbers from one to nine which give a total 15 in each line.

If you do not count rotations or reflections, there is only one such 3 x 3 magic square and the program shows how it is made when you enter one and three as the differences, and five as the middle number.

You can halt the program at any point after the input stage by pressing any key, and make it continue by again pressing any key.

Description

Line 40 selects Mode 7.
Lines 50 to 70 invite you to enter the three numbers to create a magic square.
Line 80 waits for you to enter three numbers and then sets the printing position for the magic number.
Line 90 switches off the cursor.
Line 100 prints the value of the magic number.
Lines 110 to 220 are the main program loop to create your magic square.
Lines 120 to 220 are the loop to change the vertical printing position.
Lines 130 to 210 are the loop to change the horizontal printing position.
Lines 140 and 150 calculate the horizontal and vertical coordinates of the printing position.
Lines 160 to 210 are the loop to move the four corner numbers one at a time.
Line 170 prints six spaces to erase the trail left by the moving corner number.
Line 180 changes the horizontal or vertical coordinate of the position of the number currently on the move.
Line 190 calculates the value of the current number in the magic square and prints it at the appropriate place.
Line 200 slows down the printing of the nine numbers and halts the program if you press any key.
Line 230 invites you to have another go.
Line 240 re-runs the program when you press the spacebar.



Main variables

H, V: The differences for the horizontal and vertical sequences.
M(: The middle number in the magic square.
K: Enables the three sequences to be set up and then the corner numbers to move.
C, B: Control the location of the vertical and horizontal printing position.
N: Enables the corner numbers to move to their new positions when *K* is two.
A, D: The horizontal and vertical coordinates of the printing position.

```
  10 REM 3 x 3 Magic Square
  20 REM by Jon Millington
  30 REM (c) The Micro User
  40 MODE 7
  50 PRINT "  Enter three numbers. ";
  60 PRINT " First two"'"unequal and";
  70 PRINT " one not twice the other."
  80 INPUT'',H'',V'',M TAB(12,4);
  90 VDU 23,1,0;0;0;0;
 100 PRINT "Magic Number is ";3*M
 110 FOR K=1 TO 2
 120 FOR C=-1 TO 1 STEP K
 130 FOR B=-1 TO 1 STEP K
 140 A=12*B+21
 150 D=9*C+15
 160 FOR N=30 TO 30*K
 170 PRINT TAB(A,D)SPC 6;
 180 IF N%
54 D=D-C ELSE A=A-B
 190 PRINT TAB(A,D);H*B+V*C+M
 200 IF INKEY(210-100*K)>0 G=GET
 210 NEXT N:NEXT B
 220 NEXT C:NEXT K
 230 PRINT TAB(0,23)"Again? "
 240 REPEAT UNTIL GET=32:RUN
```

Get it right ✓

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 1092 2
 50 = F479 C
 60 = A1EB B
 70 = 9B2B 4      160 = 3C36 B
 80 =  23C 2      170 = 4233 6
 90 = 4515 B      180 = 220F 1
100 = C040 8      190 = B04D D
110 = 30EF 4      200 = 9A38 B
120 = 3030 6      210 = D163 6
130 = 3345 B      220 = 6130 A
140 = 1F3E E      230 = CA8F 4
150 = B06B 6      240 = 2C03 F
```

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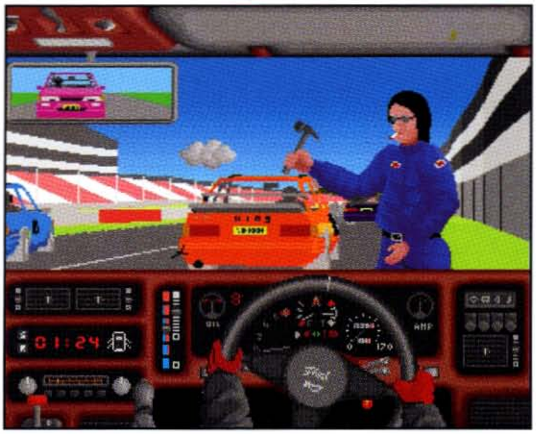
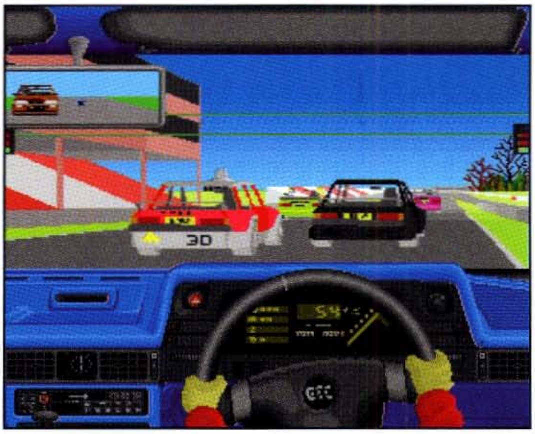

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You are an amateur racing driver just starting in the field. You race at weekends during the summer, and have a full time job at the office all week* which helps you to pay some of the gargantuan bills you incur at weekends! You have recently blown your life savings on an Astra GTE and entered a season of races ...

With your Astra you compete in class C against the other Astras and, if you prove yourself worthy by working your way up through the league, you may eventually manage to get sponsorship to race in class B. At this point you will need to buy a BMW M3, built to your exact specifications and the manufacturer's custom price. After a few more seasons you may even reach the exalted heights of a Cosworth Sierra ...

*It is beyond the scope of this program to provide a realistic simulation of a full time office job!

Dynamics

The mathematical simulation of the dynamics of a car in motion was set up by a professional physicist. A Classical Newtonian model is used for the transmission and to model the motion of the wheels on the road in both regimes of sliding. The result of all this is a program realistic enough to allow front, rear and four wheel slides, Understeer and Oversteer and of course handbrake turns.

Graphics

The game features 256 colour, mode 13 graphics, designed by a professional artist. The view is a first person, cockpit view from which you can see the road ahead, the rear view mirror and instruments. The main view features totally customised handwritten ARM code graphics routines which were necessary to maintain the superb frame rate and create a view previously undreamed of. The courses (Silverstone & Brands Hatch) feature bridges, stands, gravel traps, barriers, the pit lane, and even the man with the chequered flag. Of course there are many other features, but we think its better to save most of them to be a surprise!

Technical Information

Frame Rate	Up to 25 FPS
Object Code	250k of Handwritten Arm Code
Graphics	256 colour, mode 13 graphics Handwritten custom graphics routines
Sound	Digitally sampled sound effects (Naturally!)
Computer	Any Archimedes with 1Mbyte or more
Inputs	Mouse, Keyboard or Joystick
Serial Link	This option will be supplied on a separate disc This will hopefully be available in October '91

BBC A3000 & ARCHIMEDES PRICE £24.95

Saloon Cars is compatible with the BBC A3000 and 310 & 400 Series

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THE REAL McCOY 2

4 Game Collection

The Fourth Dimension

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The Real McCoy

A prestigious collection of 4 top games in their original format from The Fourth Dimension; U.I.M. (a massive 3D action adventure), Arcade Soccer (multi-player World Cup action), White Magic (a unique arcade role-playing adventure) & Quazer (a superfast arcade shoot'em up).

Bought individually they would cost £81.80

AFT SHIELD OUT

WHITE MAGIC
START AT OTHER END!
(C) The 4th Dimension

The Real McCoy 2

This 4 game collection really is The Real McCoy. These are genuine top games in their original format with full instructions. The games have been carefully selected and include a massive 3D mega game, an arcade isometric game and 2 quite different multi-player sports games. Bought individually they would cost £89.80p making this a very prestigious special edition collection.

APOCALYPSE (R.R.P. £29.95)

Apocalypse was written especially for the Archimedes by Gordon Key. It places you on the surfaces of varied futuristic hostile planets colonised by very varied but always ruthless enemies. In your highly advanced and extremely fast and manoeuvrable craft you must find your way around the increasingly massive planets and systematically annihilate the enemy.

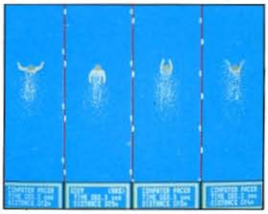
"Simply, this is the best release yet for the Arc by absolutely miles. Stunning graphics, stunning sound and masses of action. Brilliant."....Risc User

(R.R.P. £19.95) HOLED OUT

Holed Out is a superb 3D golf game also written by Gordon Key. Whether you're young or old, male or female, beginner or professional Holed Out has been designed especially for you. Features include: 2 contrasting courses, 1 to 6 players, excellent 3D graphics and sound effects, full set of accurately defined clubs, slice/hook capabilities etc. etc..

"...it is quite a stunning piece of work.".... *The Micro User*

"...I play golf and this is the nearest thing I've seen to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic."....Archive



THE OLYMPICS (R.R.P. £19.95)

The Olympics can be played by 1 to 8 players and is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems.

"Compilation packages of sporting events may have been round on other machines for ages but the first one for the Arc is every bit as good....VERDICT: A Gold Medallist."....A&B Computing (Now Archimedes World)

"Excellent graphics....Classy presentation....and plenty of variety.... Should find favour with all members of the family. Definitely recommended."....Risc User

(R.R.P. £19.95) INERTIA

Inertia is a totally original game with beautiful graphics and superb digitised sound effects and music. There are 2 massive and varied landscapes to be explored and many special tiles to be collected. Your craft floats freely around the landscapes and you must exert forces upon it to guide its speed and direction. Full colour 3 dimensional maps of the 2 landscapes can be viewed at any time and are a joy just to wander around.

".... the accompanying music is superb....Inertia is another reasonably priced game for all ages. Highly recommended.".... *The Micro User*

Lives
INERTIA

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